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CLINICAL AND NEUROPHYSIOLOGICAL FEATURES OF CHILDREN BORN PREMATURELY

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Abstract
One of the risk factors for underdevelopment of the central nervous system in children is prematurity, which is a baby born at less than 37 full weeks of gestation. Extremely important for determining the nature of prematurity, it is in premature birth to divide premature babies by body weight. However, the modern approach to the problem, dividing children only by gestational age or only by birth weight may be insufficient.

Keywords Premature, infants, central nervous system, multifactorial nature, neurophysiological nature.

INTRODUCTION

Although advances in high-risk obstetric and neonatal care have led to improved survival of preterm infants, many studies have documented the prevalence of a wide range of neurodevelopmental disorders in preterm infants [1]. The spectrum of neurodevelopmental disorders includes cerebral palsy, mental retardation, visual and hearing impairments, and more subtle dysfunctions of the central nervous system. These dysfunctions include language disorders, learning disabilities, attention deficit hyperactivity disorder, minor neuromotor dysfunction or developmental coordination disorders, behavioral problems, and social-emotional difficulties [3]. Preterm infants are more likely to have lower IQs and academic achievement, have greater difficulty in school, and require significantly more educational support than children born at term. Preterm newborns have an increased risk of repeated hospitalizations during the first few years of life and more frequent outpatient care [5]. Conditions leading to poor health include reactive airway disease or asthma, recurrent infections, and stunted growth. The youngest and immature infants have the highest risk of health problems and impaired mental development [2]. Limited data on the impact of prematurity on families suggest that caring for a premature infant has negative and positive effects that change over time, that these effects extend into adolescence and are influenced by various environmental factors over time, and that many areas of the family feel well. -substance is affected [6]. The prevalence of neuropsychiatric developmental and health disorders varies. This is not surprising given the multiple etiologies and

complications of preterm birth and the variability in both the intrauterine and extrauterine environments to which fetuses and children born prematurely are exposed [4]. Scientists of modern pediatrics, pediatric neurology, and pediatric neurorehabilitation have made great progress in the field of medicine dealing with the consequences of perinatal damage to the central nervous system (CNS) in children. The main task of specialists is conditioned by the prevention of disability formation from childhood [1, 5]. Over the past decade, researchers have argued that the basis of all CNS lesions in children is initially based on a variety of morphofunctional shifts in the brain associated with individual neuroontogenesis [2, 6]. If we consider all disorders associated with hypoxic CNS disorders as a consequence of perinatal damage, a variety of disorders is noted, including delayed motor development up to the formation of cerebral palsy, delayed psycho-speech development, cognitive deficiency, seizure syndromes, hydrocephalus, attention deficit and hyperactivity disorder, visual and auditory deficits, dysythonia [3, 7]. Literature sources of recent years, indicate that the formation involves not only cerebral changes at the level of cells, but also the formation of destructive diffusion in the area of the blood-brain barrier, and this occurs instantly (a few minutes), or in the subsequent stage with slow progression [4]. This fact leads to the cause of release of neurospecific factors into the blood that leads to neuro-conflict or pathomechanical triggering of the autoimmune process in the CNS directly related to cell migration, which is important in the formation of the growing and developing brain.

Thus, the multifactorial nature of adverse neurological outcomes in premature infants is undeniable, however, careful analysis of the leading etiologic factors in premature infants requires further in-depth study for early diagnosis, determination of the prognosis of severe consequences of diseases such as cerebral palsy, autism, and MMD and development of optimal preventive and therapeutic methods of early diagnosis and treatment[7].

Purpose of the study: To study the clinical and neurophysiological features of children born prematurely

METHODS

The use was conducted on the basis of Samaakand State Medical University, in the department of neonatology from 2021 to 2023, 69 premature babies were examined, and the children were divided into two groups depending on the birth weight: 1- children weighing from 2 to 2.5 kg (40 children), 2- children weighing from 1.5 to 2 kg (29 children). All children had gestational periods from 34-36 weeks. The main methods of research in the work were standard examinations by a neonatologist and neurologist, at the birth of the child and observation in the dynamics; the rules of diagnosis with the use of scales to identify developmental limitations were followed. Additional methods of research, as the gold standard, is neurosonography. Amplitude-integrated EEG (aEEG) was performed on patients selectively. All research methods were performed with written permission of the parents (or mother). The need for evidence of this study, a group of children (healthy) born at term and no problems during labor was created, the group of children was selected by the same pattern of standard examination and scales to detect the complete well-being of the infant 2- (26). Various neurological complications are possible as a result of premature birth, so to clarify the impact of low birth weight and underdevelopment of the brain and the whole organism, the objectives of this study included follow-up of the same children (6-7 months later), using the same indicators (clinical and neurological examination, NSG, aEEG). The standard deviation set was used for statistical analysis, t-test (Student's t-test) was used to compare groups. Differences were considered statistically significant at $p<0.05$; all parameters were calculated on an individual computer.

RESULTS

The initial stage of the study was to find out which of the factors led to prematurity and preterm labor. For this purpose, a questionnaire was carefully

administered to collect the pregnancy history (course of this pregnancy and labor). The anamnesis (interview) revealed a significant difference between the groups for the presence of factors aggravating the normal period of pregnancy. So in group 1, there was a threat of abortion in 93%, feto-placental insufficiency amounted to 27%, frequency of acute respiratory viral infections amounted to 26.6%, low water supply amounted to 10.8%, arterial hypertension - about 9%. The nature of delivery in a greater percentage of births through natural labor, it is - 89%, the rest were born by caesarean section (placenta previa, not correct head position) - 11%, where p is equal to 0.05. Body length at birth was on average 4.5 cm lower relative to the group of healthy children ($p<0.001$). Apgar scale score at the first minute of life was 5 points. The Apgar score at the fifth minute of life was 6 points.

The first group of premature infants had asphyxia in labor. Early amniotic fluid shedding occurred in 55% of pregnant women, and the group of premature infants, the complication was detachment of the normally located placenta, occurred in 17.7%. TORCH infection (mainly cytomegolovirus) was observed in 13% of cases. Neurologic syndromes in the neonatal period were evaluated, the most important of which were identified as motor disorders syndrome in 73% and oppression syndrome in 52% of cases in the first main group. In addition, excitation syndrome comparable to neonatal seizure syndrome was detected in 38.8% on average, where ($p < 0.001$):

Evaluating the results of the analysis of structural abnormalities, according to the NSG data, different cerebral structure abnormalities were noted, compared to healthy children. Thus, antenatal and postnatal HFH in group 1 was found in 29.5% of cases. Subarachnoid hemorrhage was diagnosed in only one child. Porencephalic cyst was diagnosed in one case. Periventricular leukomalacia was detected in 4 children.

When analyzing the EEG data, as noted this method of research was carried out selectively, where the main indicator was a diffuse change in bioelectric activity and a decrease in the threshold of seizure activity, so of the examined children (41 patients), only in 20% of the seizure activity was noted, and in the case of seizure pattern on aEEG-indicator was changed in 17%. In accordance with the set goals and objectives, a repeated study of children born prematurely (premature). The dynamics of neurological outcomes of children of the main group is presented in the form of changes in the CNS, these are the syndrome of muscular dystonia and the syndrome of motor disorders. Muscular dystonia syndrome was diagnosed significantly more often in premature babies (born weighing 1.5-2 kg) compared to the group of children weighing up to 2.5 kg (47.9% and 26.9%, p equal to 0.007). It should be noted that in several children the signs of motor disorders (motor disorders) corresponded to the signs of children with cerebral palsy: high tone indicated spastic diplegia and spastic hemiplegia. Spastic diplegia significantly prevailed in the group of children with lower weight (18%), the occurrence of spastic hemiplegia was in the group of children born with slightly higher weight (7.5%), where $p<0.05$. Signs of seizure activity did not reach statistical significance.

NSG and EEG parameters were compared in dynamics. According to the results of NSG examination, subependymal cysts (in one patient) were revealed; dilation of the brain ventricular system (ventriculodilatation) 32.8%, $p=0.006$, in comparative groups by weight (significantly in children with lower weight); dilation of the external liquor space, PVL, porencephalic cysts, hemodynamic disorders. At 6 months, dilatation of the external liquor space was found in 54% of children in the lower weight group, 33% of children in the higher weight group, where $p<0.001$. Porencephalic cysts were found in only one patient, in the lowest weight group. The variant of age normal according to NSG data was detected at 6 months in 22% of children of the whole main group of premature children (which coincides with the literature data), no structural changes of the brain were diagnosed in such children. Delayed formation of age-related cortical rhythms according to EEG data, revealed the following changes. Delayed formation of age-related rhythms

was significantly more frequently detected in the group of children with lower weight, in 18%, with higher weight only in 11%, where p<0.05. Seizure activity after 6 (7) months was found among all premature infants, in 3.5%.

Taking into account the data of indicators at birth and in dynamics in 6 (7) months, it is possible to control the prognosis, changes in the CNS, or the so-called definition of the risk scale. The modern approach to determining the risk of development, is aimed at graphical representation by ROC curves, which reliably clearly indicate the relevant values for assessing the condition of patients. Thus, the indicators of sensitivity and specificity of the scale were carried out using ROC-analysis, where the sensitivity of the scale was 92%, specificity - 88.2%, the predictive value of a positive result - 60%, the predictive value of a negative result - almost close to 100%.

CONCLUSIONS

Thus, children born prematurely, with low birth weight, low Apgar score, with the consequence of intrauterine asphyxia, constitute a high-risk group for perinatal CNS lesions and the formation of unfavorable neurological outcome in the distant period, in this regard, the birth of taki-children leads to an increase in neurological deficit. Premature infants, is a multifactorial disease, in the development of which the degree of maturity of the whole organism and the level of degree of prematurity, anatomo-physiological features of the brain, the level of hypoxia transferred, the combination of all stressful aspects for the child, determines the features of the clinical picture, severity of the course and prognosis of the disease are important. The leading factors of neurological disorders in children are threat of pregnancy termination, low gestational age, severe birth asphyxia, low Apgar score in the first minutes of birth. Children born with a lower birth weight are significantly more likely to show a delay in motor and psycho-speech development, which confirms the study after 6 (7) months. In addition, diagnosis according to the NSG, reveals violations of cerebral structures, in most cases at birth of premature babies, and is an important indicator of unfavorable neurological outcome. At present, neuroimaging parameters (due to the difficulty of carrying out) of the brain of children born with low birth weight and prematurely remain not fully studied, which requires the need for further research in this direction.

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