



DIAGNOSTIC SCALE FOR ASSESSING THE FUNCTIONAL STATE OF THE CARDIOVASCULAR SYSTEM IN NEWBORNS WITH PERINATAL DAMAGE TO THE CENTRAL NERVOUS SYSTEM

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Abstract. In recent years, diseases of the cardiovascular system in children have been detected more and more often, among which functional pathology of the heart is of great importance, there are not enough studies on the postnatal adaptation of the cardiovascular system and newborn children affected by perinatal hypoxia, no work has been found on corrective measures in this category of patients. Our goal was to develop a differentiated approach to the early diagnosis of changes in the functional state of the cardiovascular system in newborns with perinatal lesions of the central nervous system, therefore, a diagnostic scale for instrumental assessment of the functional state of the cardiovascular system was developed and proposed, which is determined by the value of the diagnostic coefficient and will enable early diagnosis of cardiovascular disorders systems in newborns with perinatal damage to the central nervous system.

Keywords: diagnostic coefficient, diagnostic scale, functional state of the cardiovascular system, instrumental assessment.

The relevance of research. Reducing mortality and morbidity in the neonatal period remains one of the important tasks of modern medicine. Perinatal lesions of the central nervous system of newborns occupy a leading place in the structure of perinatal morbidity and account for about 50% of children's disability. At the same time, various disorders of the condition in the perinatal period of a newborn can cause the development of cardiovascular disorders, the development of heart failure [1,2].

In recent years, diseases of the cardiovascular system in children have been detected more and more often, among which functional pathology of the heart is of great importance [8]. In newborns with perinatal hypoxia, developing hypoxic-ischemic changes in many organs and systems of the body are further manifested mainly by perinatal lesions of the central nervous system, and some children - in the form of myocardial changes, the severity of which depends on the severity of hypoxia, hemodynamic disorders, as well as their pathological interactions on each other. The complex of changes that occur in this case has an adverse effect on both the central nervous system, disrupting the regulatory influence of subcortical structures of the brain on the functional state of internal organs, and directly on the cardiovascular system, which in turn undoubtedly has an adverse effect on the neurological status, thereby creating a "closed" circle [3,4]. Considering the urgency of this problem,



as a result of the conducted studies, which determined the relationship of anamnestic, clinical, laboratory and instrumental indicators, according to the purpose and objectives of the study, there was a need to compile a diagnostic scale for assessing the functional state of the cardiovascular system in perinatal lesions of the central nervous system in newborns [5, 6, 7].

Purpose of research: for a comprehensive study of the data obtained, compile and use a table of coefficients (Table 1), which was the basis for the development of a diagnostic scale for instrumental assessment of the functional state of the cardiovascular system in newborns with perinatal lesions of the central nervous system.

Research materials: We evaluated the effectiveness of the diagnostic scale of instrumental assessment of the functional state of the cardiovascular system in newborns with perinatal damage to the central nervous system by examining 30 newborns with perinatal damage to the central nervous system in the Regional Children's Multidisciplinary Center in the Department of Neonatology.

Results and discussion: For the purpose of a comprehensive study of the data obtained, we compiled a table of coefficients (Table 1), which was the basis for the development of a diagnostic scale for the instrumental assessment of the functional state of the cardiovascular system in newborns with perinatal central nervous system lesion.

Table 1 Coefficients of risk factors for the development of congenital heart disease in newborns.

№	Factor	Characteristic of the indicator	
		indicators	Coefficient (point)
Neurosonography			
1.	Third ventricle (mm)	≤5,9	1
2.	Fourth ventricle (mm)	≤6,1	1
3.	Subarachnoid space (mm)	≤4,9	1
Echocardiography			
4.	Final systolic size (cm)	≤3,14	1
5.	Final diastolic volume (ml)	≤6,58	1
6.	Impact volume (ml)	≤5,09	1
7.	Minute blood volume, l/min	≤0,77	1

For the objectivity of further analysis, we have taken only reliably significant indicators reflecting the state of the cardiovascular and central nervous systems, the results of which we received earlier and each of which was rated 1 point. In 30 newborns with perinatal lesions of the central nervous system, divided into 3 subgroups (1, 2, and 3 subgroups) of 10 people, the diagnostic

coefficient was equal to: Diagnostic coefficient $<1,0$ point, $1,0 < \text{Diagnostic coefficient} < 4,0$ и Diagnostic coefficient $\geq 5,0$ points according to the subgroup of children.

Based on the obtained values of the coefficient of risk factors for the development of congenital heart disease in newborns and for the convenience of practical use of the result obtained, a diagnostic scale of instrumental assessment of the functional state of the cardiovascular system in newborns with perinatal central nervous system lesion was compiled. After examination of a newborn with a perinatal central nervous system lesion, in order to determine the state of the cardiovascular system, along with clinical and laboratory examination, the patient's risk factor coefficients were determined on the basis of neurosonographic and echocardiographic examination (Table. 1) and the diagnostic coefficient was calculated, which was determined by summing the scores of the coefficients of risk factors (Table 2).

Table 2 Diagnostic scale of instrumental assessment of the functional state of the cardiovascular system in newborns with perinatal central nervous system lesion.

Diagnostic coefficient	Functional state of the cardiovascular system
DC $< 1,0$ point	There are no changes
$1,0 < \text{DC} < 4,0$ point	Moderate changes
DC $\geq 5,0$ point	Pronounced changes

As can be seen from the table, the functional state of the cardiovascular system is assessed according to the presented diagnostic scale, with DC < 1.0 points there are no clinical signs of the functional state of the cardiovascular system, with $1.0 < \text{DC} < 4.0$ points moderate and with DC ≥ 5.0 points pronounced functional changes of the cardiovascular system in children with perinatal central nervous system damage are detected.

The results of the study confirmed the possibility of using a diagnostic scale for instrumental assessment of the functional state of the cardiovascular system in newborns with perinatal central nervous system lesion.

Conclusions. Thus, the results obtained in these groups of children provided additional diagnostic criteria - a diagnostic scale for instrumental assessment of the functional state of the cardiovascular system in newborns with perinatal lesions of the central nervous system, the use of which will allow timely treatment and reduce the incidence of complications of the disease. The study of literature data, analysis and discussion of their own research served as the basis for making relevant conclusions and practical recommendations.

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