

The Importance of the Thymus in the Development of Neonatal Pathology

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Annotation: The article is devoted to the importance of the thymus in the development of pathology of newborns. In particular, it was noted that age-related features of the structure and function of the organs of the immune system, as well as the thymus gland, are necessary to determine the periods of formation of immunogenesis processes at critical moments of the postnatal period, which include the period of newborn. Such information is in demand in clinical medicine with the proper organization of preventive and curative measures.

Keywords: Newborns, pathologies, thymus gland.

Relevance. In the modern world, the prevention of newborn mortality. deaths in the early neonatal period in mothers with preeclampsia and eclampsia is one of the urgent problems of modern neonatology, since the use in practical work of the criteria developed and recommended by WHO for live and stillbirth has led to an increase in the number of registered newborns with a body weight from 500 to 999 g [3,9]. Also, for a relatively small proportion (0.2-2%) among all newborns, preterm infants account for 45-55% of infant and 60-70% of early neonatal mortality [10]. At the same time, the effectiveness of nursing newborns with extremely low body weight depends on the morphofunctional maturity of the hypothalamic-pituitary-adrenal and immune systems that ensure postnatal adaptation of children [11,12]. It should be noted that the maturity of regulatory systems determines the structure of morbidity in newborns who died in the early neonatal period in mothers with preeclampsia and eclampsia. At the same time, the surviving children are diagnosed with infectious (34%), severe cerebral (33.3%), endocrine (28%) and pulmonary (20%) diseases that lead to disability at subsequent stages of development [8,15]. Adverse outcomes of various diseases in surviving children with birth weight from 500 to 750 g are 70-90%, and from 750 to 1000 g - 40-50% [13].

It has been determined that one of the main causes of death of preterm infants is infectious and inflammatory diseases, the development of which is closely related to the characteristics of the immune system. It is known that the development of the fetus, including the organs of immunogenesis, in ontogenesis is corrected and controlled by a complex functional system "mother-placenta-fetus" [5]. The transplacental penetration of maternal IgG ensures the humoral immunity of the fetus until the maturation of its immune system [4].

It should be noted that the fetal immune system develops and functions in difficult conditions. On the one hand, it supports the internal homeostasis of the fetus, and on the other, being exposed to antigenic influence from the maternal body, it must quickly adapt and respond to these influences [14]. It has been established that such processes in the immune system as proliferation, differentiation, migration, cooperation and apoptosis are genetically determined [2]. At the same time, morphoimmunogenesis is the result of a complex interaction of progenitor cells and immature thymocytes with various structural components of the stroma that form a microenvironment for lymphocytes. The main component of the

reticular framework of the thymus are multifunctional epithelial cells, a decrease in hormone-producing and cytokine functions of which serves as a structural basis for the development of immunodeficiency conditions [7].

It was revealed that metabolism, receptor expression and cytokine production create an optimal balance of lymphocyte populations and form a full-fledged response of the immune system to the effects of pathogenic factors [1]. The processes listed above have been studied in sufficient detail in cell culture and are extremely poorly described at the systemic and organizational levels.

The research results cover in sufficient detail the issues of clinical diagnosis of immune deficiency in full-term newborns and young children. And the resulting structural changes in the thymus are interpreted as the result of accidental transformation of the organ. At the same time, gestational features of the thymus are completely ignored [12]. It has been established that the reaction of the immune system to antigenic, including infectious, agents is determined by the morphofunctional maturity of the organs of this system [8]. Although the morphological aspects of the maturity of the organs of the immune system, primarily the thymus, in fetuses and newborns with extremely low body weight are insufficiently reflected in the literature and are fragmentary. It should also be emphasized that knowledge of the structural features of thymus development in the fetal period of ontogenesis is one of the important conditions for timely diagnosis of pathology of the immune system in the form of tissue malformations that form the structural basis of immunodeficiency conditions [2].

The thymus belongs to the central organs of the immune system responsible for the formation and maintenance of biological defenses of the body [1]. Immunomorphologists define the immune system as a set of organs, tissues and cells whose work is aimed directly at protecting the body from various diseases and at destroying foreign substances that have already entered the body [6]. The immune system is also an obstacle to infections (bacterial, viral, fungal). When the immune system fails, the probability of developing infections increases, which also leads to the development of autoimmune diseases [2].

Conclusion. Therefore, information on the age-related features of the structure and function of the organs of the immune system, in particular the thymus gland, is relevant for determining the periods of formation of immunogenesis processes at critical moments of the postnatal period, which include the period of newborn. Such results are in demand in clinical medicine for the proper implementation of preventive and curative measures.

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