



## THE IMPORTANCE OF AUTONOMIC REACTIVITY DURING INTOXICATION OF THE BODY IN YOUNG CHILDREN WITH ACUTE PNEUMONIA

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### Abstract

It is known how difficult it is to determine the cause of intoxication on the first day of a child's illness. To prevent an inadequate reaction, it is important to study its causes, pathogenesis and all periods of clinical development of young children with acute pneumonia.

**Keywords:** Intoxication, reactivity, childhood, pneumonia.

Cardiointervalography (CIG) was first used to assess the health status of astronauts in the 60s. Cardiointervalography has not yet taken up sufficient space in pediatric practice, although this technique is highly informative in assessing the severity of a child's condition. It provides an objective characteristic of the functioning of the autonomic nervous system, is atraumatic and convenient for examining children at different ages in any hospital or clinic. At the same time, it allows assessing the prognosis of the child's condition, the effectiveness of the therapy, and recording the norm-pathology boundaries, when maintaining homeostasis of the body is achieved at the cost of straining adaptive-compensatory mechanisms, and there are still no clinical manifestations of the disease.

It is quite obvious that the occurrence and clinical course of intoxication depends on the functional state of physiological parameters characterizing the individual characteristics of the body. Certain properties of the nervous system cannot influence the functioning of organs and tissues without the autonomic nervous system. The functioning of the autonomic nervous system is characterized by such indicators as autonomic tone and autonomic reactivity. The functional state of the autonomic nervous system determines not only the predisposition to certain diseases, but also the characteristics of their clinical course.

It is known that in response to any stimulus of an endogenous or exogenous nature, reactions arise in a living organism that are inherently protective and adaptive. The





nature of these reactions is manifested, first of all, by changes in the nervous and humoral regulation of blood circulation, which determine the nature of the interaction of the body with the environment, which is reflected in all functions of the body. Moreover, the innate mechanisms of higher nervous activity usually acquire paramount importance in extreme conditions. The nervous apparatus, the material substrate of which is the extracardiac fibers of the sympathetic and vagus nerves, carries out rapid adaptive reactions - the rapid response of the heart to external influences. Under normal conditions, when the body is exposed to weak and moderate everyday stimuli, vagal regulation is optimal, increasing the cardiac output, while in extreme situations the sympathetic channel is activated.

The disease is the result of a violation of the adequate function of adaptive mechanisms. With the help of cardiointervalography, early even before the appearance of clinical symptoms and laboratory changes, it is possible to determine the breakdown of these mechanisms. Indeed, in the process of ontogenesis, the formation of humoral mechanisms for regulating physiological functions occurs at an earlier stage than neurovegetative ones, therefore, when exposed to stress factors, vegetative homeostasis is disrupted earlier than the humoral consequences of this CIG is on average three days ahead of clinical and laboratory data. Normally, even before the development of the disease, there may be functional tension first, and then a decrease in adaptive processes, which will reflect autonomic reactivity; with tension in adaptive processes, autonomic reactivity is hypersympathicotonic, and with a decrease, asympathicotonic. Thus, inadequate adaptive-compensatory capabilities of the body, characterized by initial vagotonia, asympathicotonic vegetative reactivity and an extremely inadequate adaptive stress response, which increases the risk of the formation of a protracted course of community-acquired pneumonia [147], Research by Liverko I.V. (2005) [84] showed that the predominance of the sympathetic influence of the autonomic nervous system in patients with bronchial asthma, causing hypercatecholema, leads to a decrease in insulin secretion and insulin-binding capacity of receptors, increases the frequency of carbohydrate metabolism disorders and the conditions that precede them.

According to A.M. Wayne (2003) [3 1] from the point of view of a “somatic” approach to the problem of ANS disorders in children, it is advisable to distinguish three main levels of possible disorders: suprasegmental, segmental and subsegmental (Fig. 1.1). The first includes the limbic-reticular complex, which integrates mental, somatic, vegetative and the formation of targeted human behavioral reactions. The second level is represented by nuclei, efferent and afferent fibers, receptors of the autonomic and somatic nervous systems, which provides direct and feedback between the





suprasegmental and subsegmental levels. “Subsegmental” level is a broad concept that includes a complex of functional systems responsible for maintaining the circulation of metabolic products in the body at the proper functional level. All these levels, constituting a single physiological system for maintaining homeostasis of the body, under normal conditions function as a single whole.

The interaction of pathological factors at any level leads to a violation of the integrity of this system (disadaptation) and the formation of neurocirculatory disorders. Pathological influences of the “suprasegmental” and “segmental” levels - the influence of the nervous system - can lead to disruption of the circulation of metabolic products. In turn, circulatory disorders - a dystrophic process - have a negative impact on the structures of the nervous system itself. Under the influence of various pathological factors, numerous “vicious” circles can arise (at the molecular, subcellular, tissue, organ levels), which often aggravate the course of the pathology and cause irreversible changes in the child’s body.

Childhood is characterized by the predominance of trophotropic influences that ensure the normal structure and development of the body [42,129]. However, due to the lack of reserve functional capabilities of many organs and systems of the child, the balance of adaptation systems is often disturbed. It should be noted that disadaptation in children usually proceeds more favorably and reversibly, since they have significant opportunities for regeneration in the process of further development. Therefore, for pediatric practice, it is extremely important to assess the adaptive response, since a distinctive feature of childhood is unstable homeostasis due to morphofunctional restructuring associated with the growth and development of the child’s body. Children with asympathicotonic autonomic reactivity are prone to frequent diseases. Thus, the individual characteristics of the body, expressed through physiological, biochemical, immunological and microcirculatory indicators, play an undoubted role in the body’s predisposition to a particular disease, and also form the nature of its response, which largely determines the direction and outcome of the pathological process. The use of CIG in studies of the pathogenetic mechanisms of various manifestations of respiratory pathologies: frequent respiratory diseases, recurrent bronchitis, pneumonia and bronchial asthma, as well as non-infectious diseases of the gastrointestinal tract, vegetative-vascular dystonia, etc. made it possible to assess violations of the body's adaptive capabilities.

No less important is the question of the possibilities of drug correction of these dysfunctions of acute pneumonia due to endogenous intoxication. However, according to the literature, it was noted that practically no studies have been carried out on the role of autonomic disorders using benzonal in the development of





endogenous intoxication in sick children with acute pneumonia. This circumstance determined one of the objectives of this work: the clinical and pathogenetic study of autonomic disorders in acute pneumonia with endogenous intoxication and the study of the effectiveness of the use of benzonal in order to correct these disorders.

### **Conclusion:**

Clinical manifestations of pneumonia in young children depend on the premorbid background, which have their own characteristics depending on age and depend on concomitant pathology. Acute pneumonia in young children in 100% of cases occurs with manifestations of endogenous intoxication. Endogenous intoxication syndrome is most pronounced in children of the first year of life.

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