The immune system plays a leading role in the pathogenesis, clinical course and outcome of hypoxic and infectious diseases in newborns. An important informative indicator of the state of the child’s immune system during the adaptation period is the level of production of cytokine-polypeptide mediators ensuring the interconnection of various body systems[3].

The universality of the immune mechanisms is the reason that immune disorders and changes in the balance of pro- and anti-inflammatory cytokines play a critical role in the pathogenesis and outcome of posthypoxic destructive changes in brain tissue in children of different gestational ages [4].

Newborns with intrauterine infections (IUIs) are characterized by a high content of IL-6, IL-8 TNF-α in venous blood as a result of vaccination, invasive procedures and phototherapy[1].

Determination of cytokines in various biological fluids is of great importance in assessing the functional activity of immunocompetent cells and regulating the immune response. In some cases
(septic shock, bacterial meningitis), when cytokines, in particular TNFα, act as a leading factor in pathogenesis, determining its content in the blood or cerebrospinal fluid becomes the main method of immunological diagnostics. (up to 10 min).

Some cytokines are contained in the blood in extremely low concentrations, accumulating mainly in the focus of inflammation, in addition, the biological activity of cytokines can be masked when they are bound to inhibitor molecules circulating in the blood[2].

**Objective:** to assess the significance of cytokine status indicators in the prognosis of neonatal pathology.

**Material and methods**

A clinical and laboratory examination of 60 newborns was carried out: 21 children with intrauterine infection (group 1), 18 newborns with perinatal damage to the central nervous system (PCPSN) (group 2), and 21 - a healthy newborn child.

Exclusion criteria were congenital malformations, prematurity, traumatic lesions of the central nervous system.

All newborns were subjected to generally accepted clinical and laboratory examination methods. Determination of the content of the main pro-and anti-inflammatory cytokines (IFNγ, IL-4, IL-6, TNFα) in the urine on the 8th and 22nd day of life was performed by the method of enzyme-linked immunosorbent assay using Vector-Best reagent kits (Novosibirsk, Russian Federation). Results are expressed in pg / ml. To determine the molecular markers in the urine, we collected the morning, first portion of urine into special sterile plastic waste collectors with lids.

Statistical processing of the obtained results was carried out by methods of variation statistics using the application package Statistica for Windows. Digital data was processed on an IBM PC personal computer using Microsoft Excel-97 application memory. Information was considered reliable when t ≥2 and P <0.05.

**Results and discussion.**

As a result of the analysis of the content of cytokines in the urine of newborns on the 8th and 22nd day of life, it was found that the concentrations of TNF-α, IL-4 in group 1 do not exceed the upper limit of the concentration range of these indicators of the group of healthy newborns.

The biological effects of TNF depend on its concentration. In low concentrations, it acts as a para-and autocrine regulator of the immune-inflammatory response. In studies compared with the healthy group in newborns with IUI, there was a lack of pronounced changes in its concentration in the urine with a favorable clinical outcome in the period of both early and late adaptation (Table 1).

The concentration of IL-6 in the urine is characterized by an increase in the dynamics from the 8th day of life from 7.2 times to 19.5 times on the 22nd day of life. Differences between the mean concentrations of IL-6 in the 1st and healthy groups during the observation period were significant. Significant changes in the interferon status of newborns with IUI are observed in the first 8 days of life (Table 1).
IL-6 as an indicator of the active inflammatory process in newborns with IUI, starting from the 8th day of life, urinates by 7.2 times the ratio of the group of healthy newborns. When comparing the results of cytokine activity with clinical and biochemical data in sick newborns with IUI, on the 8th day there are parallel symptoms of systemic inflammation: an increase in body temperature, leukocytosis, tachycardia, an increase in reactive protein and a change in prothrombin index.

In the dynamics of antibacterial and infusion therapy, in the background of clinical improvement and stabilization of the newborns, by the 22nd day of life, an increase in urine IL-6 was 19.5 times compared to the group of healthy newborns and 2.7 times more than previous data (8- x days). Clinical improvement with a decrease in interferonogenesis and increased production of IL-6 indicates the activity and course of the infectious process. The obtained data prove the accumulation of cytokines in the focus of inflammation and indicate the activity of the inflammatory process, requiring the correct anti-inflammatory therapy.

Therefore, IL-6 is a prognostic marker of an infectious inflammatory process.

The contents of TNF-α, IL-4 and IL-6 in the urine of newborns of the 2nd group (with PCPSN) already in the 8th day exceeded those of the healthy group. However, it should be noted about the concentration of INF-γ in the urine, which practically does not change.

In the study of the content of IL-4, inhibiting the differentiation of T-helper type 1 and inhibiting the synthesis of pro-inflammatory cytokines by macrophages revealed its 4-fold increase in the 8th day of life. In newborns with PCVS in the order of clinical manifestation of the main cerebral blood circulation disorder syndrome, a simultaneous increase in the concentration of α-TNF in urine is observed. In the course of intensive therapy, by the 22nd day of life in newborns with a favorable outcome, there is an improvement in clinical and cytokine status, which is expressed in a significant decrease in α-TNF and IL-4 in urine relative to the indicators from the 8th day of life (p <0.05) (Table 2).
The content of IL-6 in the urine of newborns with PCNS on the 8th day of life tended to increase and was 16.2 ± 1.0 pg / ml. Already by the 22nd day of life, a significant increase was observed in 18.7 times more (256.9 ± 5.9 pg / ml) than in the healthy group (13.7 ± 0.5 pg / ml). Clinical and biochemical picture at the same time, by the 22nd day of life of newborns with a severe prognosis, persistent chin tremor, convulsive readiness, vomiting and regurgitation, dyspnea, accelerated ESR and coagulopathy showed.

Consequently, increased IL-6 in the urine indicates the body’s response to a violation of the cerebral circulation.

Simultaneous normalization of levels of TNF-α, IL-4 in the urine (with a tendency to normalization) amid an increase in IL-6 by 18.7 times suggests that IL-6, both about and anti-inflammatory cytokine, regulates the activity of the inflammatory process and is forecast marker systemic inflammatory response.

Thus, the determination of cytokines in the urine of newborns has established the advantages of non-invasive immunodiagnostics in neonatology. The control of urine cytokines in dynamics determines the prognosis of the course of both early and late adaptation of newborns. Being a marker of the inflammatory process of IL-6, both pro-and anti-inflammatory cytokine regulates the degree of systemic inflammatory response to the damaging factors of infectious and non-infectious genesis.

Bibliography: