SOME INDICATORS OF IMMUNE STATUS IN SEVERE PNEUMONIA IN YOUNG CHILDREN DUE TO CONGENITAL CLEFT LIP AND PALATE

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Abstract*. The purpose of this study is: to analyze the clinical and immunological features of the course of severe pneumonia in young children against the background of congenital cleft lip and palate (CCLP).*

Research methods: analysis, clinical observations, radiological, immunological studies.

Results obtained: clinical and immunological features of the course of severe pneumonia in young children against the background of CGN were determined.

Keywords*: pneumonia, young children, immunology, congenital cleft lip and palate.*

Relevance: acute pneumonia in young children remains a significant cause of morbidity and mortality, despite the introduction of potent broad-spectrum antimicrobial drugs into practice, the availability of complex supportive treatment regimens and preventive measures [2,5].The effectiveness of treatment for such patients depends not only on the virulence of microbes, but also on the body's resistance and its compensatory capabilities [1,6].

An unfavorable background for the course of the pneumonic process in young children is rickets, protein-energy deficiency, anemia, atopic dermatitis, dysbacteriosis, etc. They largely determine the recurrence of pneumonia in a child, the duration of their course, and the tendency to exacerbations [2].

Treatment and early rehabilitation of children with congenital cleft lip and palate (CLP) will remain one of the pressing problems of dentistry and pediatrics. Early disruption of natural feeding in this anomaly and transition to artificial feeding will lead to a decrease in the overall resistance of the body and a delay in its growth [4]. If we take into account the decisive role of breast milk in the formation of normal intestinal microflora, which is important for the proper development of the child, and the formation of the immune system, then we can assume that the basis of pathological changes in the body of children with CGN lies intestinal dysbiosis [4].

Dysbacteriosis causes an increase in treatment time for patients in specialized clinics and a deterioration in their condition due to the development of complications, often leading to the death of patients. In practice, of the entire arsenal of antibacterial agents, the group of cephalosporins has received the most widespread use in pediatric practice due to their high efficiency, low toxicity and good tolerability [4].

However, in recent years, in children with....., the tendency of the child's body to produce a dysbiotic state of the intestines, a violation of the digestive-absorbent function, cause massive inflammatory changes in the broncho-alveolar system in early childhood. Antibiotics should be used cautiously in the complex therapy of pneumonia occurring against the background of CCRN [4].

In recent years, the state of the microflora of the gastrointestinal tract has attracted the attention of microbiologists, immunologists, and pediatricians, which consists in studying some

physiological processes in the body. This is explained by the dynamic relationship of the microorganism and the non-functioning of different systems in the body as a whole [3]. In particular, the intestinal microbial flora has a morpho- and immunogenic effect, determines the state of metabolic processes of the macroorganism, utilizes undigested food substances, and activates biologically active compounds released with digestive juices, synthesizes vitamins and enzymes [4].

Purpose of the study. Study of clinical features and the nature of the immune response, the state of the microflora of the gastrointestinal tract, the course of severe pneumonia in young children against the background of CGN for optimization, diagnosis and treatment of the disease.

Materials and methods.

30 young children with severe pneumonia against the background of CGN were examined; the main group consisted of 30 children aged from 6 months to 3 years with severe pneumonia without CGN. The control group consisted of 20 practically healthy children. Along with general clinical studies, bacteriological culture from the pharynx, bronchial lavage, blood with determination of the sensitivity of microflora to antibiotics, X-ray, immunological microbiological studies were carried out. Immunological studies included determination of the main parameters of cellular and humoral immunity by identifying differentiation clusters CD3, CD4, CD16, CD20 on the cell surface using monokinal antibodies of the LT series (Too “Sorbent”, Moscow, Russia). The concentration of serum immunoglobulins A, M and G in the peripheral blood was determined using the G. Manchini method, the level of cytokines (IL-1β, IL-4 (intermekin) and TNFa (tumor necrosis factor) in the blood serum using the EFA method (enzyme-linked immunosorbent assay) (LLC " Cytokine", St. Petersburg) according to the instructions.

Quantitative parameters and species composition of intestinal microflora were assessed using standard methods before and after treatment. All research results obtained were subjected to statistical processing on a personal computer using Microsoft office Excel-2013 software. Methods of variational parametric and nonparametric statistics were used with the calculation of the arithmetic mean (b), correlation coefficient (r). The statistical significance of changes in comparison of means was calculated using Student's t test. The studies were carried out in dynamics; instrumental and general laboratory tests - before and after treatment, ELISA and immunological studies - before and a month after treatment.

Discussion results.

When diagnosing pneumonia, we used the ICD-10 classification adopted in 2010. Parents of sick children complained mainly about an increase in the child’s body temperature, anxiety, the presence of catarrhal symptoms, cough, severe weakness, shortness of breath, sleep disturbance, loss of appetite, and dyspepsia. A study of the clinic showed that the majority of children (18) had a normal temperature throughout the entire disease, 6 children had a low-grade fever, and only in 3 cases the disease occurred against a background of a high temperature of 39°C. All examined children were clinically diagnosed with pneumonia, which occurred with respiratory distress syndrome, cyanosis (20), acrocyanosis (7), weakened breathing in the lungs, and abdominal bloating (18) were noted from the moment of admission or after 2-3 days.

Intestinal syndrome developed from the onset of the disease or 2-3 days after admission, and was dominant throughout the acute period. Pneumonia without ARHN was asymptomatic; the most typical symptom was a productive cough and an increase in body temperature of 78%. X-rays revealed small focal infiltrative shadows. On the part of the blood, eosinophilia, leukocytosis,

acceleration of ESR to 15-25 mm/hour were often observed. Bacteriological examination of sputum, a throat smear revealed in children Stahpilococcus aureus in 5 children, Stapfilococcus pneumonia in 4, Staphilococcus pyogenes in 3, Haemophilus influenza, mixed microflora, Staphylococcus epidermis, Esherihia coli-y 2. Microflora was not detected in the remaining patients. In the group of children with CGN, the semiotics of respiratory damage was manifested primarily by mixed dyspnea in all patients, as well as airway resistance during exhalation in children.

Moreover, in 10 patients` exhalation was particularly difficult, that is, there was a pronounced obstructive syndrome.

Impaired external respiration function manifested itself with flaring of the wings of the nose in 12 patients, and retraction of the pliable areas of the cage in 7 patients. The frequency of individual toxic, aggravating manifestations significantly decreased in the examined children to 42.9±0.4. Intestinal syndrome developed from the onset of the disease or 2-3 days after admission and was dominant throughout the acute period. X-rays revealed long-lasting small-focal infiltrative shadows. On the blood side, leukocytosis and acceleration of ESR to 15-25 mm/hour were often observed. The effect of antibacterial therapy in such children was insignificant. In terms of humoral immunity, patients showed an increase in the level of Ig A, IgG ($P<0.001$).

In children of the control group who received basic therapy, there was a change in T-lymphocytes (DM 3+) of 46.0±1.0% against the indicators before treatment of 43.2±0.8% ($P<0.05$); B-lymphocytes (DM 20+) 25.5±1.1%-28.5±1.0% $P<0.05$); T-helpers (DM 4+) 24.5±0.7%-21.4±1.0% ($P<0.05$) and T-suppressors (DM 8+) up to 12.4±0.9% versus 11.1±0.8% ($P<0.05$).

Significant changes in immunoglobulin parameters are detected (IgA, IgM, IgG $P <0.05$). The content of NK/(DM 16+) lymphocytes in children of the control group was increased, amounting to 6.5±0.6 compared to the values before treatment ($P<0.05$). As a rule, distal rales were diagnosed. Exhalation was carried out with inhibition of auxiliary muscles, children showed restlessness, in places bronchophony, percussion-box sound. The content of TNF a in the blood serum in children with CGN was significantly increased to 3.6 ± 3.3 pg/ml (in practically healthy children 25 .2±5.5 pg/ml; $P<0.01$), the level of HL-1β was 14.3±4.1.

The data obtained allow us to think about the presence of a certain dependence of the production of TNFa, HL-1β on the nature of the pathological process, as evidenced by the high level of its secretion in children with severe pneumonia with CGN.According to our data, the content of HL-4 in children with CGN increased slightly to 9.3 ± 1.3 pg/ml (in practically healthy children 7.8 ± 3.1 pg/ml); in children with common pneumonia it was even lower - up to 8.9±1.1 pg/ml. Depending on the severity, ARHN manifestations increased slightly to 9.3±1.3 pg/ml (practically healthy children 7.8±3.1 pg/ml), in children with common pneumonia it was even less - to 8.9±1 .1 pg/ml.

Depending on the severity of ARHN, the manifestations and degree of dysbiosis were varied: from moderate to severe clinical forms. A study of 29 children with CGN, the quantitative parameters and species composition of the intestinal microflora showed significant differences. There is a shift towards gram-negative flora and anaerobic microorganisms. In the anaerobic group, there was a decrease in all studied parameters, the most pronounced ($P<0.01$) in relation to bifidobacteria and lactobacilli (4.6±0.2 and 3.2±0.1 CFU/ml, respectively). In the facultative

group, a decrease was noted in the coccal group, in the gram-negative flora, age-specific seeding rates, especially for lactose-negative strains. Escherichia and microbes of the genus Protea.

In severe pneumonia with CGN, the number of microbes in the feces of the anaerobic and facultative groups was reduced. In the anaerobic group, bifidobacteria were not sown at all, lactobacilli amounted to 2.5±0.1 CFU/ml. Thus, when studying the immune status of young children with pneumonia against the background of CGN and typical bacterial pneumonia, a mixed immunodeficiency was revealed, both in the cellular and humoral immunity, a decrease in the level of T-lymphocyte populations (CD3+ and CD3+) was noted, as in acute bacterial pneumonia).

On the humoral side of immunity, disimmunoglobulinemia was observed in children with CGN due to an increase in the level of IgM, IgA and a decrease in IgG (as in bacterial pneumonia). A study of TNFa, HL-1β and HL-4 in blood serum revealed an increase in the level of TNFa, HL-1β and a slight increase in the content of HL-4 and their ratios RD-1β/HL-4, TNFa (HL-4).

Conclusions.

1. With pneumonia against the background of CGN in young children, significant changes in the immune system were revealed, manifested by a decrease in the number of CD+ helpers (inducers, CD8+ cytotoxic lymphocytes and the immunoregulatory index CD4+ (CD8+ with an increase in the level of natural killer cells CD16+), disimmunoglobulinemia due to an increase in the content IgM, as well as an increase in the blood serum level of anti-inflammatory cytokines TNFa by 3.2 times, HL-1β by 3.7 times, the TNFa/HL ratio by 3 times and HN-1β/HL-4 by 3.5 times compared to typical bacterial pneumonia.

2. The data we obtained indicate that early disruption of natural feeding in this anomaly and the transition to artificial feeding will lead to a decrease in the overall resistance of the body and a delay in its growth.

3. The microbial flora of the intestine has a morphological and immunogenic effect, determines the state of the metabolic processes of the macroorganism.

4. Traditional complex treatment does not ensure normalization of immunity parameters in patients with pneumonia against the background of CGN, and before discharge they still had pronounced changes in immunological reactivity.

1. It should be emphasized once again that prescribing any therapeutic program without taking into account the changes in the patient's immune response is inappropriate, because will not achieve the desired effectiveness.

REFERENCES

1. Veltishev Yu.E. Formation and development of the immune system in children. Immune deficiency//Appendix to the Russian Bulletin of Cuperinatology and Pediatrics. M...-1996. P.69.
2. Geppe N.A. Respiratory infections problems and prospects // VIII Congress of Pediatricians of Uzbekistan "Providing medical care to children at the stages of reforming the healthcare system of the Republic of Uzbekistan", Tashkent, 2019, plenary session.
3. Ibragimova F.M., Murathodzhaeva A.V., Karimova M.N. "Pathogenetic aspects of the interdependence of intestinal dysbiosis in iron deficiency anemia in children."//VII Congress of Pediatricians of Uzbekistan Sat. theses 2009, pp. 189-190. Tashkent city.

4. Sidikov F.F., Aliev A.L. “The state of intestinal microbiocenosis in children with congenital cleft lip and palate.” // IX therapeutic forum “Current issues in the diagnosis and treatment of the most common diseases of internal organs.” Collection of abstracts 2017., p. 124. November 29-30. Tyumen.
5. Shamsiev F.M., Musazhonova R.A., Uzakova Sh.B. and others. Features of the immune status and cytokine profile in children with cystic fibrosis //Tibbiyotdayangi kun. Bukhoro, 2021, No. 6/38/1). P.359-369.
6. Runshoen O. Viral pneumonia/Runshoen, Lahti.E.,Jenings.E//Lancet 377 (9773): 1264-75.2011.04.99.