AMERICAN JOURNALS
Open Access, Peer Reviewed Journals

American Journal of Pedagogical and Educational Research
**ISSN (E):** 2832-9791| Volume 24, | May - 2024

# IMMUNE STATUS OF CHILDREN WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

Ibatova Sh. M.
Mamatkulova F. Kh.
Samarkand State Medical University, Samarkand, Uzbekistan

**A B S T R A C T**

In the development of chronic obstructive pulmonary disease (COPD) in children, the child's premorbid background and the state of the body's general reactivity play an important role. Among the endogenous factors that determine the likelihood of developing this disease, great importance is attached to immunological processes. We examined 100 sick children with COPD who were undergoing inpatient treatment in the children's department of the SamMI clinic No. 1. Group I consisted of 30 patients aged 3-7 years (with bronchial deformation - 24 patients; with bronchiectasis - 6), group II - 70 patients aged 8-15 years (with bronchial deformation - 46 patients; with bronchiectasis - 24 ). The conducted studies confirm the significant pathogenetic significance of immunological deficiency in COPD in children and indicate the need for its correction.

**K E Y W O R D S**

Chronic obstructive pulmonary disease, children, immune status, serum immunoglobulins, T-lymphocytes, T-suppressors, T-helpers.

## Introduction

Domestic pediatricians have shown that in the development of chronic obstructive pulmonary disease in children, the premorbid background of the child and the state of the general reactivity of the body play an important role [1,3,5,7,8]. Among the endogenous factors that determine the likelihood of developing this disease, great importance is attached to immunological processes [11-21].

The course and outcome of a chronic inflammatory process in the lungs largely depends on the state of immunological reactivity.

The study of the state of immunity in this pathology in children began a long time ago. Currently, immunological changes in chronic bronchopulmonary diseases have been sufficiently studied in works [2,4,6,9,10]. Despite the contradictory data on immunity indicators, we can already talk about the practical significance of these studies for correcting and monitoring the effectiveness of treatment. The use of various means aimed at increasing immunity significantly increases the effectiveness of treatment.

In this regard, we studied the state of immunity in sick children with chronic obstructive pulmonary disease.

## MATERIAL AND METHODS OF RESEARCH

We examined 100 sick children with chronic obstructive pulmonary disease who were hospitalized in the children's department of the SamMI clinic No. 1 from 2011-2018. Group I consisted of 30 patients aged 3-7 years (with bronchial deformation - 24 patients; with bronchiectasis - 6), group II - 70 patients aged 8-15 years (with bronchial deformation - 46 patients; with bronchiectasis - 24 ). Tests of the first and second levels were studied: isolation of lymphocytes according to Boum (1974) on a Ficcol–Verografin gradient with a density of 1.077 g/cm. The number of circulating T-lymphocytes was assessed by the method of spontaneous rosette formation according to Jondal et.all., (1972).

Determination of immunoregulatory subpopulations of T-lymphocytes, T-suppressors, T-helpers and B-rosette-forming lymphocytes (in reaction with mouse erythrocytes) was carried out according to I.V. Ponyakina and K.A. Lebedev (181). For quantitative registration of antigen-binding lymphocytes (ABL) circulating in the peripheral blood, we used the method of indirect rosette formation proposed by F.Yu.Gharib (1988). The content of the main classes of immunoglobulins A, M, G in blood serum using the radial diffusion method in agar according to Manchini et.all., (1965). The level of CEC in blood serum was determined using a standard test system. The phagocytic activity of neutrophils was assessed using a standard method with a suspension of staphylococcus.

The diagnosis of chronic obstructive pulmonary disease was verified based on a thorough collection of the child’s life history and medical history, clinical, bacteriological, immunological, radiological data, as indicated by bronchoscopic and functional research methods.

## Research Results

The studies showed that in terms of immunological reactivity, patients with this pathology differed significantly from healthy children. We conducted a study of immunity indicators upon admission of patients in the phase of exacerbation of the disease, upon discharge from the hospital and in 56 patients at follow-up.

The results of immunological studies depending on the age of the patients are presented in Table 1.

**Table 1 Indicators of cellular immunity, FAN, ASL and CEC in chronic obstructive pulmonary disease in children upon admission in the acute phase (M±m)**

| Indicators | Healthy children | | Children with chronic obstructive pulmonary disease | |
|---|---|---|---|---|
| | 3 - 7 лет | 8- 15 лет | 3- 7 лет | 8 -15 лет |
| T-lymph.,% | 59,1±1,03 | 58,1±1,18 | 42,94±1,31<br>P<0,001 | 40,7±1,2<br>P<0,001 |
| T-abs. thousand/µl | 1,84±0,11 | 1,51±0,13 | 1,26±0,1<br>P<0,01 | 1,17±0,06<br>P<0,05 |
| T-help.,% | 43,9±0,69 | 46,1±0,93 | 33,97±0,94,<br>P<0,001 | 33,93±0,83,<br>P<0,001 |
| T-suppress.,% | 7,8±0,41 | 8,2±0,63 | 5,87±0,45,<br>P<0,05 | 5,8±0,32,<br>P<0,05 |
| B-lymph.,% | 11,6±1,29 | 12,3±0,99 | 10,56±0,56,<br>P>0,1 | 9,95±0,48<br>P<0,05 |
| abs.thousand/µl | 0,36±0,04 | 0,3±0,05 | 0,39±0,03,<br>P>0,1 | 0,31±0,02,<br>P>0,1 |

| | | | | |
|---|---|---|---|---|
| Phagocytosis,% | 55,6±0,76 | 58,4±1,21 | 42,52±1,19, P<0,001 | 41,24±0,96, P<0,001 |
| abs.thousand/µl | 2,3±0,15 | 2,35±0,13 | 2,01±0,12, P>0,1 | 1,96±0,1, P<0,01 |
| ASL, % | 1,0±0,08 | 1,0±0,08 | 4,2±0,09 P<0,001 | 5,86±0,11 P<0,001 |
| CEC % | 94,5±1,0 | 96,8±1,2 | 149,2±9,17 P<0,001 | 177,9±8,42 P<0,05 |

*Note: P is the significance of the difference between the indicators of healthy children and children with chronic obstructive pulmonary disease.*

A significant decrease in the relative number of T lymphocytes was established in all age groups - 42.94±1.31% (P<0.001); 40.7±1.2% (P<0.001) compared with the control group 59.1±1.03%; 58.1±1.18%, the absolute number of T-lymphocytes P<0.05 also changed accordingly.

There was also a significant decrease in T-helper cells of 33.97±0.94% (P<0.001); 33.93±0.83% (P<0.001); and T-suppressors 5.87±0.45% (P<0.05); 5.8±0.32% (P<0.05) in the stage of exacerbation of the disease.

A study of the content of B-lymphocytes revealed a significant decrease in the relative content in children aged 8 to 15 years 9.95±0.48 P<0.05, with no significant changes at the age of 3-7 years (P>0.05) . When analyzing the absolute number of B lymphocytes, no significant deviation from the norm was detected in all patients (P>0.1).

Analysis of the results of the study of serum immunoglobulins showed that in the majority of children 54 (77.1%) aged 8-15 years, there was an increase in the level of immunoglobulins of all classes (P<0.05), which is a normal reaction to prolonged irritation, in the remaining 16 patients in 22.9% of cases there was a slight decrease in Ig A (P>0.1), IgM (P>0.1) and a significant increase in IgG (P<0.05).

The level of immunoglobulins A, M, G at the age of 3-7 years did not differ significantly from the control group of healthy children, however, in 27% of patients the IgG content was significantly increased (P < 0.001).

Indicators of humoral immunity in chronic obstructive pulmonary disease in children, depending on age, are presented in Table 2.

**Table 2 Indicators of humoral immunity in chronic obstructive pulmonary disease in children (M±m)**

| Indicators | Healthy children | | Children with chronic obstructive pulmonary disease | |
|---|---|---|---|---|
| | 3 - 7 years | 8- 15 years | 3- 7 years | 8 -15 years |
| IgA, g/l | 0,81±0,04 | 1,18±0,09 | 1,1±0,07, P>0,1 | 1,67±0,07, P<0,05 |
| IgM, g/l | 0,86±0,06 | 1,01±0,13 | 0,94±0,06, P>0,1 | 1,29±0,06, P<0,02 |
| IgG, g/l | 9,35±0,27 | 9,03±0,56 | 10,85±0,18, P<0,001 | 10,92±0,16, P<0,001 |

*Note: P is the significance of the difference between the indicators in healthy children and in children with chronic obstructive pulmonary disease.*

The given data on the state of humoral immunity can be explained as a consequence of a long-term inflammatory process, a constant strain on the humoral immune system. All this indicates the mobilization of the body's defenses primarily through the humoral route, which is not effective enough, since there is a decrease in cellular immunity, which should be taken into account when prescribing a complex of therapeutic effects.

A significant increase in immunoglobulins in 77.1% of patients aged 8-15 years indicates that the longer the disease lasted, the more immunoglobulins increased. This can be assumed to be greater maturity of the immunogenesis apparatus in patients aged 8-15 years than in patients aged 3-7 years. A significant increase in IgG in all groups of patients indicates that organic damage to bronchopulmonary tissue is accompanied by sensitization.

We studied the state of the antigen-specific component of the immune system by identifying antigen-binding lymphocytes (ABLs) sensitized to lung tissue antigens.

The results of the study showed that with chronic obstructive pulmonary disease, a pronounced immune reaction develops with an increase of 5.86±0.11% in the blood level of ASL to the pulmonary antigen in children aged 8-15 years and 4.2±0.09% in aged 3-7 years compared with a group of healthy children 1.0±0.08 ($P<0.001$).

Under conditions of an unequivalent ratio of antigen and produced antibodies, prerequisites are created for the formation of organ fixation of CECs with the implementation of their pathogenetic effect on target organs [10]. As can be seen from the data presented in Table 1, in patients in the acute phase, the concentration of CEC was significantly increased in all age groups ($P<0.001<0.05$).

The detected increase in CEC appears to be associated with constitutionally altered or acquired immunological reactivity. When studying immunity indicators, we noted a more pronounced decrease in T - and B - cell immunity in patients with bronchiectasis and severe condition with pulmonary heart failure ($P <0.05$), compared to patients with bronchial deformation and moderate severity of the condition. The content of immunoglobulins A, M, G was also high, both in comparison with the norm ($P <0.05$) and in comparison with the indicators of patients with bronchial deformation and moderate condition ($P <0.05$).

Thus, the studies conducted confirm the significant pathogenetic significance of immunological deficiency on the course of chronic obstructive pulmonary disease in children and indicate the need for its correction.

## REFERENCES

1. Ageikin V.A. Chronic bronchopulmonary diseases in children. //Medical scientific and educational and methodological journal, No. 24, 2005, p. 7-31.

2. Ataullakhanov R.I., Ginzburg A.L. Immunity and infection: dynamic confrontation between living systems. // Pediatrics, No. 4, 2005, p. 47-61.

3. Ibatova Sh.M., Mamatkulova F.Kh., Rakhmonov Yu.A., Shukurova D.B., Kodirova M.M.Assessment of the Effectiveness of Treatment of Rachit in Children by Gas-Liquid Chromatography. //International Journal of Current Research and Review, 2021, 13 (6), P. 64-66.

4. Ibatova Sh. M., Mamatkulova F. Kh., Ruzikulov N.Y. The Clinical Picture of Acute Obstructive Bronchitis in Children and the Rationale for Immunomodulatory Therapy. International Journal of Current Research and Review. Vol 12 Issue 17. September 2020. - P.152-155.

5. Sh. M. Ibatova, F. Kh. Mamatkulova, N. B. Abdukadirova, Yu. A. Rakhmonov, M. M. Kodirova. Risk Factors for Development of Broncho-Ostructive Syndrome in Children. International Journal of Current Research and Review. Vol 12. Issue 23 December 2020. -P. 3-6.
6. Ibatova Sh.M., Mamatkulova F.Kh., Rakhmonov Y.A., Shukurova D.B., Kodirova M.M. Assessment of the Effectiveness of Treatment of Rachit in Children by Gas-Liquid Chromatography. International Journal of Current Research and Review. Vol 13, Issue 06, 20 March 2021. P.64-66.
7. Sh.M. Ibatova, F.Kh. Mamatkulova, D.S. Islamova. Efficiency of combined application of apricot oil and aevit as a regulator of lipase activity of blood serum in children with vitamin D-deficiency rickets. Journal of Critical Reviews. // ISSN-2394-5125. VOL 7, ISSUE 11, 2020. P.1266-1274.
8. Ibatova Sh.M., Baratova R.Sh., Mamatkulova F.Kh., Ergashev A.Kh. State of immunity in chronic obstructive pulmonary disease in children. Asian Journal of Multidimensional Research (AJMR). Vol.10, Issue 3, March, 2021. P. 132-136.
9. Ibatova Sh.M., Abdurasulov F.P., Mamutova E.S. Some aspects of diagnostics of out-of-social pneumonia in children indications for hospitalization. EPRA International Journal of Research and Development (IJRD) Volume: 6 | Issue: 4 | April 2021. P. 242-244.
10. Ibatova Sh.M., Mamatkulova F.Kh., Mukhamadiev N.K. State of immunity in chronic obstructive pulmonary disease in children. Central Asian Journal of Medical and Natural Sciences Volume: 02 Issue: 05 | Sep-Oct 2021 ISSN: 2660-4159. P. 103-107.
11. Ibatova Sh.M., Muhamadiev N.Q. Efficiency of immunomodulating therapy in acute obstructive bronchitis in children. Central Asian Journal of Medical and Natural Sciences. Volume: 02 Issue: 02 | March-April 2021 ISSN: 2660-4159. P. 210-213.
12. Ibatova Sh.M. D.S. Islamova, Sh.O. Akhmedov. The use of cumin oil in the treatment of children with rickets // J. Problems of biology and medicine, Samarkand. - 2015. - No. 2 (83). - R. 50-52.
13. 18.Sh.M.Ibatova, F.Kh.Mamatkulova, N.B.Abdukadirova, Kh.M.Oblokulov, F.A. Achilova. The effectiveness of the use of apricot oil in children with rickets. // Scientificand practical journal "Questions of Science and Education", Moscow, 2019, No. 27 (76), R.40-46.
14. Sh.M.Ibatova, F.Kh.Mamatkulova Gas chromatographic evaluation of the use of apricot oil and aevit in the complex therapy of vitamin D-deficient rickets in children. Scientific journal "New day in medicine". No. 2 (30/2) 2020. R. 265-267.
15. Ibatova Sh.M., F.Kh. Mamatkulova M.M. Kodirova. Evaluation of the effectiveness of treatment of rickets in children by gas-liquid chromatogramphy Asian Journal of Multidimensional Research Vol. 9, Issue 10, October, 2020. R. 44-47.
16. Kaganov S.Yu. Modern problems of pulmonology in children.//J. Russian Bulletin of Perinatology and Pediatrics. Moscow.2003, No. 3. With. 9-16.
17. Rachinsky S.V., Tatochenko V.K., Volkov I.K. The place of chronic pneumonia and chronic bronchitis in bronchopulmonary pathology in children. //Pediatrics, No. 1, 2004, p. 58-62.
18. Chuchalin A.G. Chronic obstructive pulmonary diseases. M.: Binom, 2000. p. 306-307.
19. Ibatova Sh.M., Mamatkulova F.Kh., Ibragimova M., Akhmedov D. Clinic, diagnostics and indications for hospitalization for pneumonia in children. EPRA International Journal of Research and Development. Volume: 7, Issue:6, June 2022.
P. 280-283

20. Ibatova Sh.M., Islamova D.S., Goyibova N.S. Studying the level of immunoglobulins in the blood serum of children in depending on feeding. eurasian journal of medical and natural sciences. 2023. P. 10-14.
21. Sh.M. Ibatova, Sh.M. Uralov F.Kh.Mamatkulova. Bronchobstructive syndrome in children. Web of Scientist: International Scientific Research Journal.ISSN: 2776-0979, Volume 3, Issue 5, May, 2022. P,518-522.