INTERNATIONAL JOURNAL OF
INTEGRATIVE AND
MODERN MEDICINE

The Importance of Immunological Analysis in the Prevention of the Development of Familial Asthma in the Uzbek Population

Okboev Toshpulot Alixodjayevich, Zakiryayeva Parvina Odilovna
Department of Internal Medicine № 4, Samarkand State Medical University

Annotation: The article examines the importance of serum immunoglobulin, anti-inflammatory, and enhancer cytokine spectrum in early detection and prevention of the risk factor that triggers the development of the disease in familial bronchial asthma. The study was conducted in 346 relatives in 49 families with bronchial asthma. This examined total serum IgE, IL-6 and interferon-g using the "Vector-Best" test-system according to the IFA method. Total serum IgE, IL-6, and interferon-g levels of patients with familial asthma have been analyzed for pathogenetic types of bronchial asthma disease, disease spikes, disease seniority, and disease control rates. In this case, it has been shown that different manifestations of familial asthma at the control level of withdrawal steps, types, duration of the disease and the amount of total IgE, IL-6, interferon-g are important in the prevention and early diagnosis of risk factors that cause the development of the disease in the family.

Keywords: family bronchial asthma, total IgE, IL-6, interferon-g, risk group, disease prevention.

Relevance. One of the modern requirements of medicine instructs the doctor to actively look for risk factors for the development of bronchopulmonary pathology. This can significantly affect the course of the disease, the outcome and, accordingly, the possibility of timely treatment. Currently, the study of the influence of risk factors on the development of respiratory diseases has attracted the attention of many scientists around the world. In particular, risk factors play an important role in the formation of bronchial asthma (BA) and are known to influence the course of the disease and the prognosis of the disease. The increase in the prevalence of bronchial asthma in developed countries is mainly due to environmental factors - risk factors, their presence and degree of influence determine the manifestation of the disease in people with an atopic predisposition. In most cases, bronchial asthma manifests itself as an atopic phenotype. It is important to study the state of hyperproduction of immunoglobulin E, which occurs as a result of prolonged contact with allergens in everyday life, for the early identification of risk factors in individuals with a tendency to develop familial asthma.

Also, under the influence of risk factors for bronchial asthma, cytokines participate in the development of chronic inflammation and are responsible for the nature of inflammation. There fore, it is important to study the role of immunological analysis indicators in the prevention and early diagnosis of risk factors that cause the development of the disease in individuals in a family with a genetic predisposition to familial asthma among the Uzbek population.

The purpose of the study. To study the importance of total IgE and IL-6, IFN-γ cytokines in preventing the development of familial asthma for families in the risk group in the Uzbek population.

Research materials and methods. The level of total IgE and IL-6, interferon-g in the blood serum of patients with bronchial asthma was studied in 49 probands and 346 relatives from 49 families with a hereditary predisposition to familial bronchial asthma. Relatives of the proband in the family were divided into 3 groups: relatives with asthma (82/346 - 23.70%); other allergic diseases (allergic rhinitis, atopic dermatitis, etc. (81/346 - 23.41%), as well as healthy relatives in the family (183/346 - 52.89%). The age of those included in the study was 4-78 years [average 33.55 years old] had 395 family members, of which 186 (47.09%) were men and 209 (52.91%) were women.

All patients with familial asthma underwent comprehensive clinical, functional and laboratory examinations. Examination of patients was carried out in accordance with the diagnostic criteria of the

WHO international classification (based on the revision of ICD-10) and the global strategy for the treatment and prevention of bronchial asthma (GINA, 2022).

Immunological analyzes of family members were conducted in the laboratory of the Institute of Immunology and Immunodiagnostics of the Academy of Sciences of the Republic of Uzbekistan. Determination of INF-γ and IL-6 levels in blood serum was performed by IFA method.

For the control group, 21 (11 men and 10 women) healthy individuals aged 17-62 years (average 28.64) were examined.

The results of the statistical processing of the obtained data were performed using the Microsoft Excel program on the Rentum-IV computer.

Result: In order to study the immunological status of patients with familial BA, immunological tests were performed in 82 patients with familial BA and 183 individuals without BA. The amount of total IgE, IL-6 and interferon-g, considered immunological markers of BA, in the peripheral blood serum was checked by the IFA method. .

Analyzing the obtained results, it can be said that the parameters of inflammatory and anti-inflammatory cytokines in patients with familial BA show an increase in total IgE, IL-6 and interferon-g producing immunocomponent cells in blood serum. Familial asthma in immunological examination of patients selected for the study total IgE, IL-6 and interferon-γ levels in the peripheral blood serum of patients infected with the disease were reliably increased by 295.94 ± 21.91 ME/ml ; 13.83 ± 0.98 pg/ml ; up to 7.07 ± 0.40 pg/ml and in the control group this indicator was 67.2 ± 16.44 ME/ml, respectively ; 8.6±2.4; It was 4.4±0.8 pg/ml ($r<0.001$, $p<0.01$, $p<0.05$). (table 1) .

Table 1. Status of total IgE, IL-6 and interferon-γ indicators in blood serum of patients with familial asthma

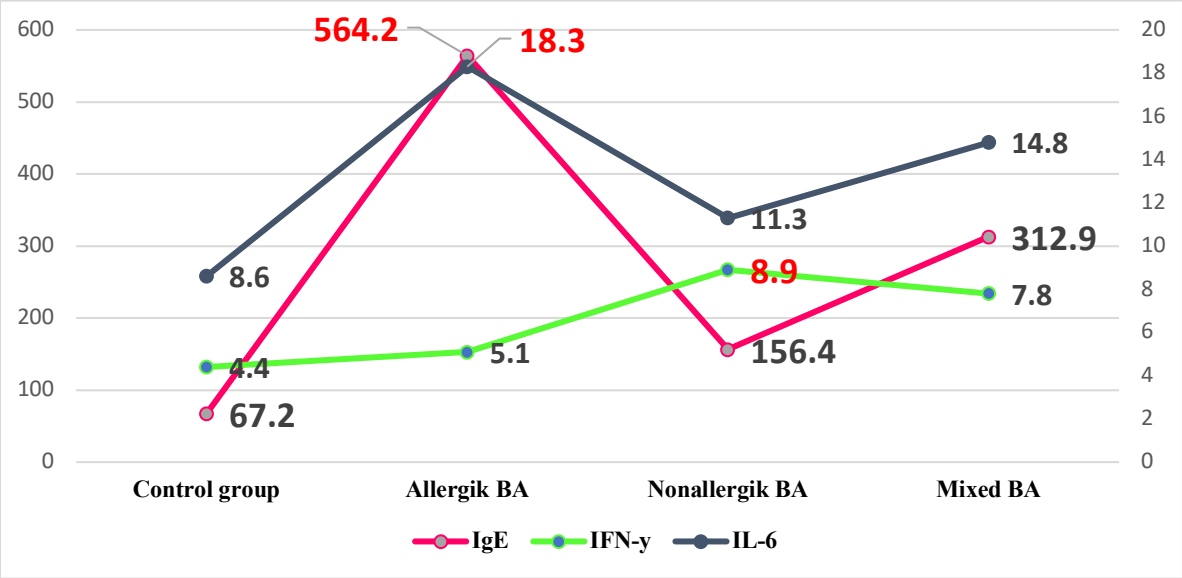
Indicator	Control group n =21	Main group n = 82	t	p
Total IgE ME/ml	67.2±16.44	295.94 ± 21.91	8.35	<0.001
IL-6 pg/ml	8.6±2.4	13.83 ± 0.98	2.02	< 0.05
Interferon-g pg/ml	4.4±0.8	7.07 ± 0.40	2.99	<0.01

Note : the reliability of the results was compared to those in the control group ($p<0.001$, $p<0.01$, $p<0.05$)

Based on the results of examination of patients, the production level of general IgE, IL-6 and interferon-g determined in the peripheral blood serum of patients with pathogenic types of familial asthma was studied. The amount of total IgE, IL-6 and IFN-g in peripheral blood serum of patients with allergic type of familial BA, respectively (564.2±72.04 ME/ml; 18.3±1.3 pg/ml; 5.1 ±0.12 pg/ml) statistically reliable from the indicator of practical healthy individuals (67.2±16.44 ME/ml; 8.6±2.4 pg/ml; 4.4±0.8pg/ml) increased ($r<0.001$, $r<0.05$).

The amount of total IgE, IL-6 and IFN-g in peripheral blood serum of patients with nonallergic type of familial BA, respectively (156.4±21.5 ME/ml; 11.3±1.06 pg/ml; 8.9 ±1.08 pg/ml) reliably exceeded the values of healthy individuals (67.2±16.44 ME/ml; 8.6±2.4 pg/ml; 4.4±0.8pg/ml) was noted ($r<0.01$, $r<0.05$).

Total IgE, IL-6 and IFN-g levels in peripheral blood serum of patients with mixed type of familial BA, respectively (312.9±44.23 ME/ml; 14.8±1.23; 7.87±1, 28 pg/ml) was found to be reliably higher than the indicator of practically healthy individuals (67.2 ±16.44 ME/ml; 8.6±2.4; 4.4±0.8 pg/ml) ($r<0.001$, $r<0.05$) [Fig. 1].



Note : the reliability of the results was obtained with respect to those in the control group (p<0.0 0 1, p<0.0 1 , p<0.05)

Figure 1 . Status of production of IgE, IL-6 and IFN-γ in disease types

The study of the level of IgE, IL-6 and IFN-γ products in patients with familial BA showed that the amount of inflammatory IgE and cytokines in the peripheral blood was high, regardless of the pathogenetic types of the disease.The amount of IgE, IL-6 and IFN-γ in peripheral blood serum is allergic (564.2±72.04 ME/ml ; 18.3±1.3 pg/ml ; 5.1±0.12 pg/ml) , non-allergic (156.4±21.5 ME/ml ; 11.3±1.06 pg/ml ; 8.9±1.08 pg/ml) and mixed (312.9±44.23 ME/ml; 14.8±1.23; 7.87±1.28 pg/ml) statistically significant difference was observed (p<0.01 , p<0.01 , p<0.05) . This information about the immunological mechanisms in the pathogenesis of familial asthma can be the basis for recommending a new differentiated approach to diagnosis and pathogenetic treatment that stops the development of airway inflammatory diseases. The highest index of total IgE detected in the peripheral blood serum confirms that it is a diagnostic immunological marker in the allergic type of the disease (564.2±72.04 ME/ml). Compared to other types of the disease, patients with familial asthma allergic type have increased IL-6 levels in peripheral blood serum, It was shown that the decrease in the amount of interferon-g is a comparative diagnostic marker for the differentiation of pathogenetic types of the disease.

The patients with bronchial asthma in the family were evaluated according to the steps of the disease . Amounts of total IgE, IL-6 and IFN-g in peripheral blood serum in patients with all steps of familial asthma according to severity b a significant increase was noted. In step I of the disease , respectively (311.1±32.4 ME/ml ; 18.2±2.9 pg/ml ; 7.2±1.1 pg/ml) in the control group (67 ,2 ±16.44 ME/ml; 8.6±2.4; 4.4±0.8 pg/ml) , respectively (262.6 ± 2 1 , 3 ME / ml ; 17.7±2.1 pg/ml ; 7.8±0.9 pg/ml) in the control group (67.2 ±16.44 ME/ml; 8.6±2.4; 4.4±0.8 pg/ml) , III - step in accordance (171 ,6±18.6 ME/ml ; 14.5±2.7 pg/ml ; 8.9±1.4 pg/ml) in the control group (67.2 ±16.44 ME/ml; 8.6±2.4; 4.4±0.8 pg/ml) , IV – pog respectively (132.3 ± 12.7 IU/ml ; 12.3±1.9 pg/ml ; 9.6±1.2 pg/ml) in the control group (67.2 ±16.44 ME/ml; 8.6±2.4; 4.4±0.8 pg/ml) (p<0 ,0 0 1, p<0.01, p<0.02 , p<0.05) [2 – table].

Table 2. Immunological indicators of the severity of asthma in the family

Group	IgE ME/ml	IL-6 pg/ml	IFN-γ pg/ml
Control n=21	67.2±16.44	8.6±2.4	4.4±0.8
step I	311.1 ± 3 2.4* ***	18.2± 2.9 * *	7.2 ± 0.9 *
step II	262.6±2 1 , 3 * ***	17.7± 2.1 * **	7.8 ± 0 , 7 * **
step III	171.6 ± 18 , 6 * ***	14.5 ± 1 , 2 *	8.9 ± 1.4 * **
step IV	132.3 ± 1 2.7 * **	12.3 ± 1 , 9	9.6 ± 1 , 2 * **

*Note: *-differences are significant compared to control group values (*-p< 0.0 5, **- p< 0.02, ***- p< 0.01, * *** - p<0.001).*

Thus, in patients with secondary bronchial asthma, the amount of total IgE and IL-6 in the patient's blood serum decreased with the increase in the steps of the disease, but the amount of IFN-γ increased. Changes in the amount of total IgE, inflammatory and anti-inflammatory cytokines , which are the criteria of allergic inflammation, can be evaluated as markers of the inflammatory process in familial bronchial asthma. In familial bronchial asthma, it can be explained that as a result of deficiencies in the immune system, it causes the development and stress of the disease . This shows that it is a criterion for timely diagnosis of the disease and determining treatment tactics.

In our research, it was observed that as the duration of the disease in the family increases, the disease becomes more severe and the rate of remission increases. For this reason, the analysis of the immunological parameters determined in patients with familial asthma will be carried out according to the duration of the disease . As the duration of the disease increases, the amount of total IgE, IL-6 in the peripheral blood serum of patients i it was noted that the amount of IFN-g significantly decreased .

In patients with familial bronchial asthma, the total amount of IgE in the peripheral blood serum, duration of the disease up to 5 years - 304.2 ± 24.9 ME/ml , 5-10 years - 271.6 ± 26.7 ME/ml, 10-15 years - 189.4 ±25.8ME/ml, over 15 years - 172.7±22.4 ME/ml , compared to the control group - 67.2±16.44 ME/ml, it was reliably increased (p<0.0 0 1).

IL-6 in peripheral blood serum in patients with familial asthma quantity disease duration up to 5 years - 16.2±1.9 pg/ml , 5-10 years - 15.4±2.1 pg/ml , 10-15 years - 14.6± 1.3 pg/ml , from 15 years over time - 13.1±2.9 pg/ml was recorded, and when compared with the control group - 8.6±2.4 pg/ml, a reliable difference from the statistical group was observed (p<0.02 , p<0.05).

The amount of IFN-g in peripheral blood serum in patients with familial asthma disease duration up to 5 years - 6.0 ± 0.9 pg/ml , expressed in values of 5-10 years - 6.4±1.2 pg/ml , 10-15 years - 7.2± 0 , 7 pg/ml , and control group - 4.4±0.8 There was a significant difference in pg/ml . Only in a period of more than 15 years - 8.4 ± 1.4 pg/ml and it was observed that a reliable difference was recorded (p<0.05) [table 3].

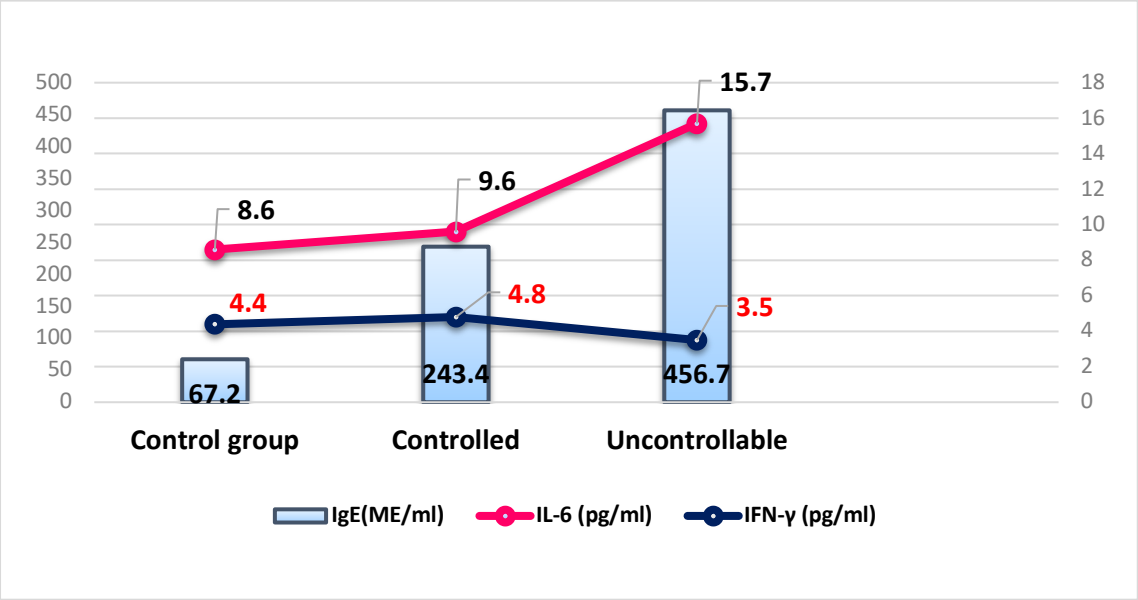
Table 3. Immunological status of familial asthma according to disease duration

Group	Control n=21	1-5 years	5-10 years	10-15 years	> 15 years
IgE ME/ml	67.2±16.44	304.2±2 4 , 9 ***	271.6±2 6 , 7 ***	189.4±2 5 , 8 ***	172.7 ±2 2.4 ***
IL-6 pg/ml	8.6±2.4	16.2 ± 1.9 **	15.4± 2.1 *	14.6 ± 1 , 3 *	13.1± 2.9
IFN-γ pg/ml	4.4±0.8	6.0 ± 0 , 9	6.4 ± 1 , 2	7.2 ± 0.7 **	8.4 ± 1.4 *

*Note: *-differences are significant compared to control group values (*-p< 0.0 5, **- p< 0.02, *** - p<0.001).*

The results obtained showed that the study of the immunological mechanisms of the pathogenesis of familial asthma, i.e., is of great importance in the development and continuation of the inflammatory process of the respiratory tract. the role of general IgE, IL-6 and IFN-γ pathology.

Immunological parameters determined in patients with familial asthma were evaluated according to the degree of disease control . It was noted that the amount of total IgE in peripheral blood serum was significantly increased in patients with familial asthma who did not achieve control (456.7±32.8 ME/ml) compared to patients who achieved control (243.4±29.3 ME/ml) (p<0.0 0 1). Compared to the control group, the total IgE content (67.2±16.44 ME/ml) was found to have a reliable difference in both groups (p< 0.001) .



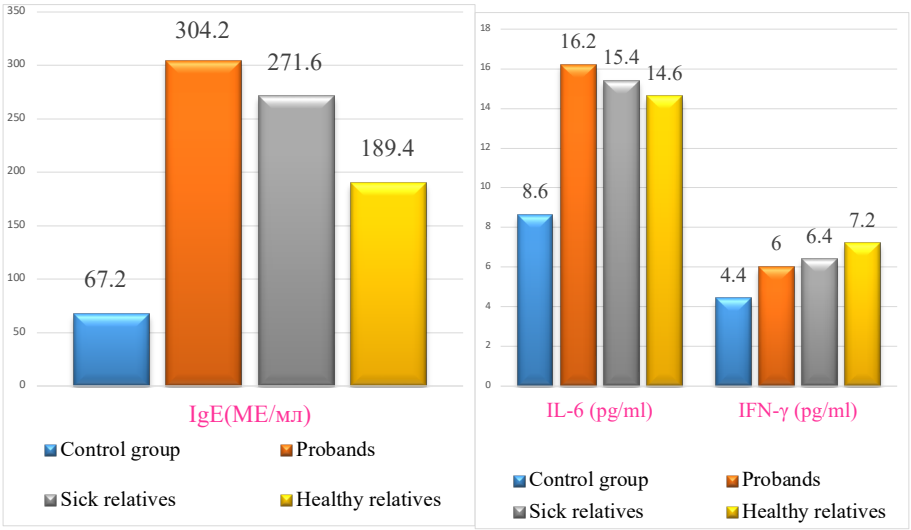
Note : the reliability of the results was obtained with respect to those in the control and study groups ($p<0.001$, $p<0.05$)

Figure 2. Characterization of immunological indicators of control of bronchial asthma in the family

The amount of IL-6 in peripheral blood serum was significantly increased in patients with familial asthma who did not achieve control (15.7±2.3 pg/ml) compared with control patients (9.6±1.9 pg/ml) ($p < 0.05$). The amount of IL-6 in the control group (8.6±2.4 pg/ml) was significantly increased compared to the control group ($p<0.05$). It was noted that the amount of IFN-γ in peripheral blood serum was significantly reduced in patients with familial asthma who did not achieve control (3.5±0.8 pg/ml), compared with patients who achieved control (4.8±0.9 pg /ml). The amount of IFN-γ in the control group was 4.4±0.8 pg/ml (Fig. 2).

A study of the level of total IgE and IL-6 showed that their content in peripheral blood was high, regardless of the period of disease control, and uncontrolled ($p < 0.001$). It was noted that the amount of IFN-g was significantly reduced in those who failed to achieve disease control. Thus, these indicators of cytokine production in disease control were explained as the basis of a new approach to diagnosis.

It is known from the literature that changes in the immunological state of the body are one of the main causes of the pathogenesis of asthma. IgE and cytokines, which are immunological markers of inflammation, depend on the level of expression, stage of the disease and severity of the disease. This is of great importance when studying the immunological status of individuals in the family, diagnosis, treatment and prevention. In the control group (proband, relatives with familial asthma and healthy ones), the amount of total IgE, IL-6 and IFN-g was analyzed. The amount of total IgE in peripheral blood serum in family probands was 304.2±24.9 IU/ml, in relatives with BA - 271.6±26.7 IU/ml, in relatives without BA - 189.4±25.8 IU/ml. When comparing these groups in the family, the value of immune parameters - 67.2±16.44 IU/ml was statistically significantly higher ($p<0.001$). The amount of IL-6 in the peripheral blood serum of probands was 16.2±1.9. pg/ml, in relatives with BA - 15.4±2.1 pg/ml, in relatives without BA - 14.6±1.7 pg/ml. Compared to the control group - 8.6±2.4 pg/ml, in all of the above groups this was expressed in a significant increase ($p<0.02$, $p<0.05$). The amount of IFN-γ in peripheral blood serum was 7.1±1.2 pg/ml in probands, 5.1±0.9 pg/ml in relatives with BA, 4.8±0.8 pg/ml in relatives without organized by BA. In the control group, this indicator was recorded - 4.4±0.8 pg/ml (Fig. 3).



Note : the reliability of the results was compared to those in the control group ($p<0.001$, $p<0.02$, $p<0.05$)

Figure 3. Immunological status of individuals grouped in the family

Thus, the amount of total IgE in blood serum was reliably high in all examined groups in the family, including probands, relatives with bronchial asthma and relatives without bronchial asthma ($p< 0.001$) . These sources confirm that the development of IgE-mediated mechanism plays a key role in the development of allergic inflammation in familial bronchial asthma, and indicate the presence of an allergic background in relatives without bronchial asthma . The levels of IL-6 and IFN-g detected in the blood serum of patients in the family also corresponded to the periods of the disease and showed that they are biomarkers of inflammation .

In family research groups Correlation of IgE, IL-6 and IFN-γ indicators according to pathogenetic types of the disease is shown in table 4.4 .

In patients with familial bronchial asthma, there is a correlation between pathogenetic types of the disease and IgE - IL - 6 concentration levels in all groups of patients. there is a statistically correct relationship, r=0.64 in the general group; $p<0.01$, allergic type r=0.7 4 ; $p<0.01$ there is a positive correlation , in the non-allergic type r= 0.11 ; $p<0.05$, in mixed type r= 0.25 ; It was found that $p<0.05$ had a weak positive correlation.

In patients with familial bronchial asthma, there is a correlation between pathogenetic types of the disease and IL - 6 - IFN-γ concentration level in all groups of patients. there is a statistically inverse relationship, r=-0.33 in the general group; $p<0.0$ 2, allergic type r=-0.21; $p<0.05$, nonallergic type r = -0.41 ; $p<0.0$ 2, it was found that there is a negative weakly expressed correlation relationship , no correlation relationship was observed in the mixed type .

4 – table. Correlation of IgE, IL-6 and IFN-γ indicators in the studied groups

Patients group	Correlative indicators		
	IgE-IL - 6	IL - 6-IFNg	IgE-IFNg
General group	0.64	-0.33	-0.34
p	<0.01	<0.02	<0.02
Allergic	0.74	-0.21	-0.30
p	<0.01	<0.05	<0.02
Non-allergic	0.11	-0.41	0.04
p	<0.05	<0.02	> 0.05
Mixed	0.25	0.04	0.22
p	<0.05	> 0.05	<0.05

In patients with familial bronchial asthma, the pathogenetic types of the disease and the concentration level of IgE - IFN-γ in all groups of patients there is a statistically opposite relationship, in the general group r=-0.3 4 ; p<0.0 2, allergic type r= -0.30 ; p<0.0 2, , the presence of a weakly expressed correlation relationship, in the mixed type r= 0, 22 ; p<0.0 5 positive weakly expressed correlation was noted, and in the non-allergic type No correlation was observed.

The results of the conducted correlation analysis show that the development of cytokines in different pathogenetic forms of bronchial asthma is unique. Table 4.4 a shows that interleukins are involved in the types of pathology, in patients with all types of the disease , IgE - IL - 6 is more, IL - 6 - IFN-g and IgE - IFN-g are slightly less involved.

And so, the results of the study of the immunological status of patients with familial asthma showed that the highest index of total IgE detected in the blood serum was observed in the allergic type of the patient , confirming that this is a diagnostic immunological marker. In patients with familial bronchial asthma, the total IgE and IL-6 levels in the patient's blood serum decrease as the steps of the disease progress, but the amount of IFN-g increases , and the total IgE and IL-6 levels in the patient's blood serum increase with the duration of the disease. decrease, and increase of IFN-g level showed that it is a criterion for timely diagnosis of the disease and setting treatment tactics. The high level of total IgE in relatives without bronchial asthma is consistent with the presence of an allergic background in them.

Studies have shown that patients with familial asthma have immune deficiency associated with disturbances in immune system activity and cytokine status. These can be said to be the basis for conducting a comparative diagnosis of different forms and levels of bronchial asthma in the family , a new approach to its pathogenesis , and drawing up a coordinated treatment plan based on this .

Conclusion: Thus , steps of family bronchial asthma , types , disease duration and total IgE, IL-6, and interferon-g levels at the control level . different manifestations, especially the high amount of total IgE detected in healthy relatives in the family, show that it is important to prevent and early diagnosis of the risk factors that cause the development of the disease in the family . This indicates the need for timely treatment and preventive planning.

LITERATURE

1. Aralov N. R. et al. The role of the polymorphic lekus of the enos3 gene and its interaction with the public and government structures //Achievements of science and technology education. – 2019. – №. 9-1 (50). – Pp. 34-39.
2. Aralov N. et al. Studying the spectrum of anti- and pro-inflammatory cytokines in blood serum in familial bronchial asthma //Journal of Problems of Biology and Medicine. – 2017. – №. 3 (96). – Pp. 24-26.
3. Aralov N.R., Okboev T.A., Davidyan A.A., Holliev R.H., Klebleeva G.D., Sh Ziyadullaev.H. Production of immunoregulatory cytokines IL-6, IFN-γ and IgE antibodies in various pathogenetic forms of bronchial asthma. BULLETIN of the Association of Pulmonologists of Central Asia. Tashkent 2013, issue 16 (No. 1-4). Pp. 53-56
4. Aralov N.R., Okboev T.A., Khodzhieva N.S., Klebleeva G.D., Zakiryaeva P.O. Study of the spectrum of anti- and pro-inflammatory cytokines in blood serum in familial bronchial asthma. Biology of tibbiet muammolari, 2017, No.3 (96) pp. 33-36.
5. Drygina L.B., Alkhutova N.A. Production of class E immunoglobulins in patients with atopic allergies. // Medical Immunology. -2002. - Vol. 4, No. 2, - p. 175.
6. Dityakovskaya E.M., Dzyak G.V. Possibilities of titokine correction in the large brongial system // Asthma ta allegory. -2002. -No.1. -pp. 19-21.
7. Dugarova I.D., Anaev E.H., Chuchalin A.G. On the role of cytokines in bronchial asthma //Pulmonology.-2009.-No.4. –pp.96-102.

8. Prosekova E.V., Derkach V.V., Shestovskaya T.N. Cytokines in bronchial asthma in children //Cytokines and inflammation. -2002. -Vol.1 -No.2.- pp. 99-100.
9. Okboev T. A., Klebleeva G. D., Aralov N. R. The role of the polymorphic locus of the yeNOS3 gene in the formation of bronchial asthma //Academic Journal of Western Siberia. - 2013. – Vol. 9. – No. 1. – pp. 54-55.
10. Okboev T. A., Kleva G. D., Aralov N. R. The role of the polymetallic lekus of the eNOS3 gene in the programming of the bronzial system //Academic Journal of the Arctic Region. Siberia. – 2013. – Vol. 9. – No. 1. – pp. 54-55.
11. Okboev T. A., Klebleeva G. D. Studying the degree of control of familial bronchial asthma by immune parameters //HIST. The All-Ukrainian magazine of students and young students. Chernovtsy. – 2016. – №. 18. – p. 470.
12. Ryabova L.V., Zurochka A.V. Differences in the cytokine cascade in patients with bronchial asthma depending on the stage of the disease // Medical immunology.-2007.-vol.9-No.4-5.-pp.493-498.
13. Smirnova S.V., Zenkina L.V., Kadricheva S.G. The role of certain cytokines in the pathogenesis of bronchial asthma // Pulmonology: 13 National Congress on respiratory diseases: Collection summary. St. Petersburg, 2003.-p.138.
14. Freydin M. B., Kulmanakova I. M., Ogorodova L. M., Puzyrev V. P., Salyukova O. A. Family correlations and heritability of interleukin-4 (IL-4) / 10 National Congress on Respiratory Diseases. November 1-4, 2000, St. Petersburg. Sat. summary // Pulmonology. – 2000. – Adj. – p. 128.
15. Baharier L.B.,Geha R.S. Molecular mechanisms of IgE regulation // J.Allerg and Clin.Immunol.-2000.-Volume 105.-pp.547-558.
16. Chang K.F., Barnes P.J.Cytokines in bronchial asthma //Chest.-1999.Volume 54.pp.825-857.
17. Kholzhigitova M. B. et al. Characteristics Of Clinical And Functional Parameters In Covid-19 Patients With Chronic Obstructive Pulmonary Disease //Bulletin of Science in medicine and in life. – 2023. – vol. 1. – No. 2. – pp. 106-111.
18. Kholdzhigitova M. B., Ubaidullayeva N. N. CHANGES IN FUNCTIONAL PARAMETERS AND PHYSICAL ENDURANCE IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE //Oriental Journal of Medicine and Pharmacology. - 2022. – Vol. 2. – No. 05. – PP. 32-35.
19. Kholdzhigitova M. B., Ubaidullayeva N. N. GENERAL CHARACTERISTICS OF PATIENTS WITH COPD DEPENDING ON WHETHER THEY HAVE A METABOLIC SYNDROME //Oriental Journal of Medicine and Pharmacology. – 2022. – vol. 2. – No. 06. – pp. 21-29