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Clinico- Immunological Parallels in Chronic Obstructive Bronchitis in Adolescents

Muhayyo Kholjigitova*

Department of Hospital Therapy and endocrinology, Samarkand Medical Institute, Uzbekistan

***Corresponding author:** Muhayyo Kholjigitova, Department of Hospital Therapy and endocrinology, Samarkand Medical Institute, Samarkand, Uzbekistan, Tel: 347-394-69-30; E-mail: merrymind0595@gmail.com

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Abstract

The aim of this work was to study the concentration of IL-8 in conjunction with clinical and functional parameters of the COB in adolescents. Surveyed 52 teenagers and young men suffering from COB aged 11 to 21 years old. The control group consisted of 22 healthy individuals. Options for clinical COB 3 subgroups were identified. To examine the extent of production of IL-8, depending on the severity of the disease showed that IL- 8 levels in the serum increased significantly PC. It is noted that higher concentrations of IL- 8 cytokine was observed in patients with severe chronic obstructive bronchitis. ERF also made observations in these patients, depending on the stage and severity of disease. When functional examination in adolescents with COB were indicators showed a reduction in FVC, FEV1, PEF, MEF25, MEF50, MEF75, MEF25-75 which corresponded to a mixed disorders of pulmonary ventilation function with a predominance of obstructive variant. Thus, in patients with COB stradayushih adolescent relationship marked functional performance parameters of pulmonary cytokine status, in particular IL- 8.

Keywords: IL-8; Chronic obstructive bronchitis; Respiratory function

Urgency of the Problem

Respiratory diseases take place in the pathology of childhood and adolescence, differing significant prevalence and tendency to recurrent course [1,2,3]. One of the causes of chronic obstructive chronic bronchitis (COB), the frequency of relapses and torpid to the ongoing traditional therapy are developing disturbances in the immune system. Of great importance in the pathogenesis of chronic obstructive bronchitis given cytokine regulation in the development of proliferative phase of inflammation in the bronchial tubes in the process of modeling pulmonary diseases of different etiologies. It is known that the leading role in shaping the protracted course of inflammatory diseases of the respiratory tract in children and adolescents belongs to immunological mechanisms, which involve a wide range of cytokines responsible for activation, proliferation and chemotaxis of different cells. Interleukin-8 (IL) is one of the most active α-inflammatory chemokines released in inflammation and is expressed on the surface of endothelial cells.

In available literature there are some facts of increasing the level of IL-8 in the blood of patients with systemic inflammation, including chronic obstructive bronchitis. [4-10]. In clinical practice, in recent years, the problem of COB in adolescents is becoming more and more significant, which is associated with a persistent trend to increasing in the number of adolescents with complaints about the disease, treatment failure, uncertainty of the forecast, thereis no exploration in this disease. Establishment of the violations in the system immunity COB is the goal of many studies, since the expansion of understanding of the pathogenesis of the disease may contribute to the development of new training and prevention activities at COB.

Materials and Methods

The production of proinflammatory cytokine IL-8 immune serum COB was studied patients in adolescence with the clinical course. A total of 52 teenagers and young men suffering from chronic obstructive bronchitis at the age of 11 to 21 years were examined. The control group consisted of 22 healthy individuals MF. Verification of COB patients was conducted according to the international classification of WHO (X revision, ICD-10). The examination included assessment of general clinical research methods (survey, the study objective status, routine paraclinical tests - complete blood count, urinalysis, a general analysis of sputum, ECG, X-ray examination of the chest).

Obligatory method was to study respiratory function (ERF) of the lungs, which was carried out on the unit «SPIROSIFT-SP-5000" to automatic processing parameters (FUKUDADENSHI, Japan). Functional monitoring included measurement of peak expiratory flow (PEF), and / or forced expiratory volume in one second (FEV1) in the morning and evening, with the calculation of the index of the daily variability of the bronchial tubes, carrying bronchomotor tests. ERF evaluation before and after the pharmacological and non-pharmacological tests carried out in accordance with the recommendations of "Standardization of lung function tests Research" (Appendix "Pulmonology", 1993). Determining the level of IL-8 in serum was performed by ELISA using a test system for ELISA 'ELISA-IL-8 "(JSC" Vector-Best ", Russia, 2011).

The data obtained were subjected to statistical analysis on a PC Pentium-IV program, developed in the package EXCEL using a library of statistical functions with the calculation of the arithmetic mean (M), standard error (m), the relative values (frequency,%), t-test (t) with calculating the probability of error (P). On clinical variants of COB were divided into 3 subgroups: 1g-26 teenager with mild illness - COB-1, 2g-15 teenager with moderate flow - COB-2, 3g-11 teenager

with severe COB-3 Total patients with chronic obstructive bronchitis - 52 people.

Results and Discussion

The main symptoms of chronic obstructive bronchitis in teenagers were cough and sputum production for two years, at least three consecutive months. On examination revealed the general symptoms, such as sweating, weakness, fever, decreased mental and physical potential. The analysis of cytokine status parameter in the studied patients with COB in teenagers found a high production of IL-8 immune cells. Thus, the content of the cytokine IL-8 in the serum of patients with COB in teenagers was significantly increased up to 76,2 ± 5,0 pg / ml 23,9 ± 3,31 pg / ml in controls (p <0.01).

Group	Healthy	Overall group of patients with COB	t	p
IL-8 pg / ml	23,9 ± 3,31	76,2 ± 5,0	5,3	p <0,01

Table 1: Indicators of IL-8 in patients with COB in teenagers

Examining of extent of production of IL-8 depending on the severity of the disease showed that IL-8 levels in the serum increased significantly PC. Thus, the concentration of IL-8 in serum PC adolescents COB patients with severe 76,2 ± 5,0 pg / mL, the average severity was 53,5 ± 2,14 pg / ml, with a mild illness - 40,6 ± 1 18 pg / ml, while in the group of healthy controls - 23,9 ± 3,31 pg / ml.

Group	Healthy n = 22	COB-1 n = 40	COB 2 n = 25	COB-3 n = 23	P2-1	P 3-1	P 3-2
IL-8 pg / ml	23,9 ± 3,31	40,6 ± 1,18	53,5 ± 2,14	76,2 ± 5,0	p <0,01	p <0,01	p <0,05

Table 2: Indicators of IL-8 in patients with COB in teenager's severity of the disease

It should be noted that higher concentrations of cytokines IL-8 was observed in patients with severe COB. ERF also made observations in these patients, depending on the stage and severity of the disease.

Index	The total group COB patients	Stage remission	Stage exacerbation
FVC%	70,1 ± 1,05	56,5 ± 4,6 *	66,9 ± 4,7 *
FEV1%	68,4 ± 4,5	52,6 ± 6,5 *	44,1 ± 3,4 *
IT%	78,5 ± 1,0	68,5 ± 5,6 *	52,4 ± 5,4 *
PSV%	85,1 ± 0,4	48,9 ± 3,1 *	42 ± 1,6 *
MOS25%	71,8 ± 1,6	42,3 ± 2,3 *	39,3 ± 2,1 *
MOS50%	50,4 ± 0,9	55,5 ± 3,4 *	57,6 ± 2,5 *
MOS75%	79,2 ± 1,8	87,6 ± 6,7 **	82,7 ± 5,3 *
MOS25-75%	111,8 ± 2,9	89,6 ± 6,7 **	88,7 ± 4,3 *

Table 3: Indicators ERF COB patients in their teens, depending on the stage of the disease

*degree of reliability of the results p <0,05

In the study of adolescents suffering from respiratory function COB a decreased rate indexes and indicators reflecting expiratory lung volumes.

Index	Overall indicator of a group of patients with COB	Light for (COB-1)	For medium-heavy (COB-2)	Heavy course (COB-3)
FVC%	70,1 ± 1,05	66,5 ± 4,6 *	59,6 ± 4,2 *	56,9 ± 4,7 *
FEV1%	68,4 ± 4,5	62,6 ± 6,5 *	49,6 ± 5,2 *	45,1 ± 3,4 *
IT%	78,5 ± 1,0	78,5 ± 5,6 *	79,5 ± 4,9 *	82,4 ± 5,4 *
PSV%	85,1 ± 0,4	58,9 ± 3,1 *	43,8 ± 2,4 *	32 ± 1,6 *
MOS25%	71,8 ± 1,6	52,3 ± 2,3 *	46,8 ± 1,9 *	39,3 ± 2,1 *
MOS50%	50,4 ± 0,9	65,5 ± 3,4 *	52,4 ± 3,1 *	37,6 ± 2,5 *

MOS75%	79,2 ± 1,8	87,6 ± 6,7 **	71,4 ± 4,9 *	62,7 ± 5,3 *
MOS25-75%	111,8 ± 2,9	89,6 ± 6,7 **	76,2 ± 5,2 *	68,7 ± 4,3 *

Table 4: Indicators ERF COB patients in their teens, depending on the severity of the disease

*degree of reliability of the results p <0,05

During functional studies in adolescents with chronic obstructive bronchitis a the reduction of FVC, FEV1, PEF, MOS25, MOS50, MOS75, MOS25 75, were cleared out that corresponded to a mixed disorders of pulmonary ventilation function with a predominance of obstructive option.

Index	FVC%	FEV1%	ИТ%	PSV%	MOS25%	MOS50%	MOS75%	MOS25-75%
IL-8	0,28	-0,38	-0,21	-0,34	-0,25	-0,36	-0,12	-0,25
p	<0,05	<0,02	<0,05	<0,05	<0,05	<0,02	<0,05	<0,05

Table 5: Correlation between functional performance and lightweight serum concentration of IL-8

Results

Further, in order to detect possible links between functional performance and lightweight serum concentration of IL-8 immunocytokine us correlation analysis. The results of the correlation analysis showed negative correlation with functional indicators light serum concentration of IL-8 immunocytokine indicators, except for FVC%. The most significant inverse correlation was observed between the ratio of FEV1% serum and IL-8 immunocytokine (r = -0,38; p <0,02). The correlation coefficient between the FVC% functional indicator immunocytokine and concentration of IL-8 was a positive number, and r = 0,28 (p <0,05).

Thus, the IL-8 concentration depends on the clinical manifestations of the disease, with the increase in the severity of clinical signs of disease observed immunocytokine increased production of IL-8. Adolescents suffering COB celebrated relationship with pulmonary functional parameters cytokine status, in particular IL-8.

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