Ежеквартальный
научно-практический
журнал

ISSN 2181-1008
DOI 10.26739/2181-1008

ЖУРНАЛ

гепато-гастроэнтерологических исследований

№2 (Том 6)

2025

ISSN 2181-1008
Doi Journal 10.26739/2181-1008

ЖУРНАЛ ГЕПАТО-ГАСТРОЭНТЕРОЛОГИЧЕСКИХ ИССЛЕДОВАНИЙ

ТОМ 6, НОМЕР 2

JOURNAL OF HEPATO-GASTROENTEROLOGY RESEARCH

VOLUME 6, ISSUE 2

ТОШКЕНТ-2025

ISSN 2181-1008 (Online)

Научно-практический журнал
Издается с 2020 года
Выходит 1 раз в квартал

Учредитель
Самаркандский государственный медицинский университет, tadqiqot.uz

Журнал зарегистрирован в Узбекском агентстве по печати и информации

Адрес редакции: 140100, Узбекистан, г. Самарканд, ул. А. Темура 18.
Тел.: +998662333034, +998915497971
E-mail: **hepato_gastroenterology@mail.ru.**

Page Maker | Верстка: Хуршид Мирзахмедов

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ISSN: 2181-1008
www.tadqiqot.uz
JOURNAL OF HEPATO-GASTROENTEROLOGY RESEARCH
ЖУРНАЛ ГЕПАТО-ГАСТРОЭНТЕРОЛОГИЧЕСКИХ ИССЛЕДОВАНИЙ

УДК 616.24-008.47

Allanazarov Alisher Boymurotovich
Assistant of the Department №1 of Pediatrics and Neonatology
Samarkand State Medical University, Samarkand, Uzbekistan.
ORCID: 0000-0003-2318-5004. E-mail: alisherpediatr@mail.ru

GENERAL STATUS OF CYTOKINES IN ACUTE OBSTRUCTIVE BRONCHITIS IN FREQUENTLY ILL CHILDREN

http://dx.doi.org/10.5281/zenodo.000000000

ANNOTATION

Acute obstructive bronchitis remains one of the most common and severe diseases of the respiratory system in children. The main direction of our scientific research was to study the mechanisms of development, establish the characteristics of the clinical course, assess the role of the immune status, cytokines in acute obstructive bronchitis in frequently ill children, to develop pathogenetic methods of treatment and preventive measures.

Purpose of the scientific research: To study the state of cytokines in acute obstructive bronchitis in frequently ill children.

Material and research methods. To establish the relationship with the cytokine profile indicators, a survey was conducted of 120 patients with acute obstructive bronchitis, divided into 2 groups: Group I - 40 patients with acute obstructive bronchitis from the group of “occasionally ill children”; Group II - 80 patients with acute obstructive bronchitis from the group of “frequently ill children”.

Research results. The decrease in IL-4 levels in children of group II (9.60±0.18 pg/ml), in comparison with patients of group I (12.60±0.24 pg/ml, P<0.001), indicates less pronounced allergic processes observed in AOB in children with acute respiratory syndrome. It was revealed that immunological markers of AOB can be high values of the studied interleukins of the anti-inflammatory (IL-1 by 4.8 times, IL-4 by 2.6 times, IL-10 by 2.2 times) and pro-inflammatory (IL-6 by 1.1 times, IL-8 by 1.9 times and TNF-α by 1.2 times) classes, in comparison with standard indicators (P<0.01, P <0.001), which indicates their importance in the pathogenetic mechanisms of the inflammatory process and the suppression of the mechanisms of immune status in biofeedback.

Conclusions. The study showed that cytokines are one of the key mediators of pathogenesis, regulating the recruitment and activation of immune cells and inflammatory processes in the respiratory tract. Understanding the role of cytokines in obstructive bronchitis in children can provide insight into the mechanisms, features of the course, potential diagnostic and therapeutic measures of the disease.

Key words: obstructive bronchitis, cytokines, immunity, frequently ill children.

For citation: Allanazarov A.B. /General status of cytokines in acute obstructive bronchitis in frequently ill children

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Allanazarov Alisher Boymurotovich
1-pediatriya va neonatologiya kafedrasi assistenti,
Samarqand davlat tibbiyot universiteti, Samarqand, O'zbekiston.
ORCID: 0000-0003-2318-5004. E-mail: alisherpediatr@mail.ru

TEZ-TEZ KASAL BO'LADIGAN BOLALARDAGI O'TKIR OBSTRUKTIV BRONXITDA SITOKINLARNING UMUMIY HOLATI

ANNOTATSIYA

O'tkir obstruktiv bronxit bolalarda nafas olish tizimining eng keng tarqalgan va og'ir kasalliklaridan biri bo'lib qolmoqda. Ilmiy izlanishlarimizning asosiy yo‘nalishi rivojlanish mexanizmlarini o‘rganish, klinik kechish xususiyatlarini o‘rnatish, tez-tez kasal bo‘lgan bolalarda o‘tkir obstruktiv bronxitda immun holati, sitokinlarning rolini baholash, davolash va profilaktika choralarining patogenetik usullarini ishlab chiqishdan iborat bo‘ldi.

Ilmiy tadqiqotning maqsadi: tez-tez kasal bo'lgan bolalarda o'tkir obstruktiv bronxitda sitokinlar holatini o'rganish.

Materiallar va tadqiqot usullari. Sitokin profili ko'rsatkichlari bilan bog'liqlikni o'rnatish uchun 2 guruhga bo'lingan o'tkir obstruktiv bronxit bilan og'rigan 120 nafar bemor o'rtasida so'rov o'tkazildi: I guruh - "epizodik kasal bolalar" guruhidan o'tkir obstruktiv bronxit bilan og'rigan 40 bemor; II guruh - "tez-tez kasal bolalar" guruhidan o'tkir obstruktiv bronxit bilan og'rigan 80 nafar bemor.

Tadqiqot natijalari. II guruh bolalarida IL-4 darajasining pasayishi (9,60±0,18 pg/ml), I guruhdagi bemorlarga nisbatan (12,60±0,24 pg/ml, P<0,001), o'tkir respirator sindromli bolalarda AOBda kuzatilgan allergik jarayonlarning kamroq namoyon bo'lishini ko'rsatadi. Yallig'lanishga qarshi (IL-1 4,8 marta, IL-4 2,2 marta, IL-10 2,2 marta) va yallig'lanishga qarshi (IL-6 1,1 marta, IL-8 va T-12 indikatorlari bilan) o'rganilgan interleykinlarning yuqori qiymatlari AOB ning immunologik belgilari bo'lishi mumkinligi aniqlandi (P<0.01, P <0,001), bu ularning yallig'lanish jarayonining patogenetik mexanizmlarida va biofeedbackda immunitet holati mexanizmlarini bostirishda muhimligini ko'rsatadi.

Xulosa. Tadqiqot shuni ko'rsatdiki, sitokinlar patogenezning asosiy vositachilaridan biri bo'lib, immun hujayralari va nafas yo'llarida yallig'lanish jarayonlarini to'plash va faollashtirishni tartibga soladi. Bolalardagi obstruktiv bronxitda sitokinlarning rolini tushunish mexanizmlar, kursning xususiyatlari va kasallik uchun potentsial diagnostika va terapevtik choralar haqida tushuncha beradi.

Kalit so'zlar: obstruktiv bronxit, sitokinlar, immunitet, tez-tez kasal bolalar.

Алланазаров Алишер Боймуротович
ассистент кафедры педиатрии №1 и неонатологии
Самаркандский государственный медицинский университет, Самарканд,Узбекистан.
ORCID: 0000-0003-2318-5004. E-mail: alisherpediatr@mail.ru

ОБЩИЙ СТАТУС ЦИТОКИНОВ ПРИ ОСТРОМОМ ОБСТРУКТИВНОМ БРОНХИТЕ У ЧАСТО БОЛЕЮЩИХ ДЕТЕЙ

АННОТАЦИЯ

Острый обструктивный бронхит остается одним из распространённых и тяжело протекающих заболеваний дыхательной системы у детей. Основным направлением нашего научного исследования явилось изучение механизмов развития, установление особенностей клинического течения, оценки роли иммунного статуса, цитокинов при остром обструктивном бронхите у часто болеющих детей, для разработки патогенетических методов лечения и профилактических мероприятий.

Цель научного исследования: Изучить состояние цитокинов при остром обструктивном бронхите у часто болеющих детей.

Материал и методы исследования. Для установления взаимосвязи с показателями цитокинового профиля проведено обследование 120 с острым обструктивным бронхитом разделённых на 2 группы: I группа- 40 больных острым обструктивным бронхитом из группы «эпизодически болеющие дети» II группа -80 больных с острым обструктивным бронхитом из группы «часто болеющие дети».

Результаты исследования. Снижение уровней IL-4 у детей II группы (9,60±0,18 пг/мл), в сравнении с больными I группы (12,60±0,24 пг/мл, P<0,001), свидетельствуют о менее выраженных аллергических процессах, наблюдаемых при ООБ у ЧБД детей. Выявлено, что иммунологическими маркерами ООБ могут явиться высокие значения исследованных интерлейкинов противовоспалительного (IL-1 в 4,8 раза, IL-4 в 2,6 раз, IL-10 в 2,2 раза) и провоспалительного (IL-6 в 1,1 раза, IL-8 в 1,9 раз и TNF-αв 1,2 раза) классов, в сравнении с нормативными показателями (P<0,01, P<0,001), что указывает на их значимость в патогенетических механизмах воспалительного процесса и угнетении механизмов иммунного статуса при БОС.

Выводы. Исследование показало, что цитокины являются одними из ключевых медиаторов патогенеза, регулируют набор и активацию иммунных клеток и воспалительные процессы в дыхательных путях. Понимание роли цитокинов при обструктивном бронхите у детей, может дать представление о механизмах, особенностях течения, потенциальных диагностических и терапевтических мероприятиях заболевании.

Ключевые слова: обструктивный бронхит, цитокины, иммунитет, часто болеющие дети.

Relevance. In pediatric practice, one of the modern diagnostic signs of the group of "frequently ill children" is the state of local and systemic immune indicators, inflammatory and anti-inflammatory cytokines, but their role in the formation of the pathological process is only from the point of view of compatibility. It is known that common respiratory diseases in children, including acute obstructive bronchitis, lead to a violation of compensatory-adaptive mechanisms, with the development of chronic recurrent infections, defects in the cellular and humoral components of the immune state [1,3,8].

In viral infections that are common in children, there is a decrease in the protective function of the respiratory tract, in which the continuation of the virus in the epithelium, its multiplication occurs; in allergic reactions of the mucous membrane of the respiratory tract, the resulting inflammatory metabolites cause the production of inflammatory mediators; with changes in the immune system, cytotoxic antibodies are formed in the submucosa layer of the bronchial tree, which eventually leads to obstructive syndrome [6,9].

A number of authors emphasize the importance of cytokine profiling in patients with obstructive bronchitis, because a clear inflammatory process in the respiratory tract is caused by an imbalance of cytokines [2,4]. The study of the role of cytokines in diseases remains relevant today [7,11]. Cytokines are glycosylated polypeptides that regulate immunity. According to their biological activity, cytokines are divided into regulators of humoral, cellular immunity, development of allergic reactions or immunosuppressive response [5,12]. Cytokines have the function of regulating inflammation, which is very important in the pathogenesis of obstructive bronchitis [10].

The purpose of scientific research: Study of cytokine status in acute obstructive bronchitis in children with frequent illness.

Materials and research methods. The paper presents the results of anamnestic, clinical, generally accepted laboratory, paraclinical and special examination methods with acute obstructive bronchitis in children from the group of “frequently ill children” who were hospitalized in the pediatric intensive care units, I and II emergency pediatrics of the Samarkand branch of the Republican Scientific Center for Emergency Medical Care.

All patients had typical clinical symptoms of broncho-obstructive syndrome; the diagnosis took into account the data of standard laboratory and instrumental examinations.

In order to determine the correlation with the indicators of the cytokine profile, a survey was conducted among 120 patients with acute obstructive bronchitis, divided into 2 groups: Group I - 40 patients with acute obstructive bronchitis from the group of "episodically ill children". Group II - 80 patients with acute obstructive bronchitis from the group of "frequently ill children".

The anamnestic method included collecting anamnesis (antenatal, intranatal, postnatal), assessing the pedigree, and analyzing the child’s developmental history. The content of circulating immune complexes: CEC was determined by precipitation with a 3.75% solution of polyethylene glycol. The concentration of cytokines IL-1β, IL-4, IL-6, IL-8 and TNF-α was determined by enzyme immunoassay using Vector-Best test systems (Novosibirsk, Russia) at the private diagnostic medical center “INNOVA” (Samarkand).

Research results. It is known that interleukins play a key role in various biological processes, including the activation, differentiation and proliferation of immune cells, as well as in the regulation of adaptive and innate immunity and inflammatory processes in the body.

In the study of cytokine indices, a significant difference was found in almost all studied indicators in patients of Acute obstructive bronchitis I and II groups compared to healthy children. (Table 1).

Table 1.

Cytokine parameters in patients with Acute obstructive bronchitisduring hospitalization (M±m).

Indicators	The norm	Group I	Group II	P_1	P_2	P_3
IL-1β, pg/ml	6,23±0,32	29,85±1,00	22,25±0,42	<0,001	<0,001	<0,001
IL-4, pg/ml	4,85±0,32	12,60±0,24	9,60±0,18	<0,001	<0,001	<0,001
IL-6, pg/ml	17,27±0,73	19,62±0,54	22,95±0,39	<0,01	<0,01	<0,001

IL-8, pg/ml	10,34±0,37	19,85±0,73	23,25±0,40	<0,001	<0,001	<0,001
IL-10, pg/ml	10,34±0,57	22,80±0,57	33,12±0,70	<0,001	<0,001	<0,001
TNF-α, pg/ml	24,81±1,03	28,58±1,08	32,16±0,70	<0,001	<0,01	<0,01

Note: P1 - standard values and children with acute obstructive bronchitis, P2 - normative values and children with acute obstructive bronchitis, P3 - significance of differences between children with acute obstructive bronchitis and children with acute obstructive bronchitis.

In children with episodic acute obstructive bronchitis, the production of endogenous anti-inflammatory IL-1 4.8 times, IL-4 2.6 times, IL-10 2.2 times, and anti-inflammatory cytokines IL-6 1.1 times, IL-8 1.9 times, and TNF-α 1.2 times increased significantly compared to normal values (P<0.01, P<0.001):

The increase of cytokines is the result of the influence of infectious factors that cause the development of acute obstructive bronchitis, their balance determines the course and prognosis of the disease.

An increase in the level of IL-1 of group I, taking into account its role in inflammatory reactions, leads to swelling and narrowing of the airways observed in obstructive bronchitis in children.

IL-4 is produced by T-lymphocytes and basophils, their increase activates the synthesis of IgE, and at the same time enhances allergic reactions in the bronchi in acute obstructive bronchitis in children.

In children with episodic disease, the moderate increase in IL-6 concentration in the blood confirms the presence of inflammatory and infectious processes in the respiratory tract, their excess can lead to an increase in the inflammatory reaction and an increase in the symptoms of the disease.

In children with episodic acute obstructive bronchitis, the level of IL-8 increased to 19.85 ± 0.73 pg / ml, which in response to the inflammatory process in the respiratory tract activates neutrophils, which play an important role in the protection of the body, and indicates the superiority of the cellular phase of immunity over the humoral one. In the hyperactivation of neutrophils, there is a possibility of increased pathological inflammatory processes with subsequent damage to lung tissue.

An increase in the level of IL-10 in children with acute obstructive bronchitis may indicate the body's struggle to reduce the intensity of the inflammatory process.

In acute obstructive bronchitis in children, the high level of TNF-α is one of the factors of the body's innate immune response, and in response to the introduction of an infectious agent, it suppresses the growth and development of intracellular microorganisms, then it acts as an immunoregulator, witnessing the activation of the immune system and the inflammatory process. [Хаитов, Р.М. Иммунология / Р.М. Хаитов; научное редактирование А.Л. Ковальчук. – Москва: ГЭОТАР – Медиа, 2016. – 496 с.]

In the group of children who get sick quickly, with the development of acute obstructive bronchitis, an increase in the level of cytokines in the blood was observed, the concentration of IL-1 was 3.6 times, IL-4 was 2 times, IL-6 was 1.3 times, IL-8 was 2.2 times, IL-10 was 3.2 times, and TNF-α was 1.3 times compared to the normative values (P<0.01, P<0.001) and the concentration of IL-1 was increased. Decreased by 0.7 times, IL-4 decreased by 0.8 times, IL-6 by 1.2 times, IL-8 by 1.2 times, IL-10 by 1.5 times, and TNF-a by 1.1 times by 0.7 times. In children with episodic acute obstructive bronchitis (R<0.01, R<0.001), this disproportion is a manifestation of lung damage in patients of this group. shows that it is a unique feature of being.

IL-1 is the most important mediator of the inflammatory and immune process, participates in the activation of T- and B-lymphocytes, and high levels (22.25 ± 0.42 pg / ml) observed in acute obstructive bronchitis in children who often get sick lead to a severe course of the disease by deepening the inflammatory processes of the respiratory tract.

A decrease in the level of IL-4 in children of group II (9.60±0.18 pg/ml) compared to patients in group I (12.60±0.24 pg/ml, P<0.001) indicates a low manifestation of allergic processes in children with acute obstructive bronchitis.

An increase in the level of IL-6 to 22.95 ± 0.39 pg / ml in acute obstructive bronchitis in children who get sick quickly indicates the intensity of the reserve capacity of the immune response, which stimulates the production of other inflammatory and anti-inflammatory cytokines, including IL-10, TNF-α, and can contribute to the regulation of inflammatory processes in the disease.

In acute obstructive bronchitis (23.25 ± 0.40 pg / ml) in children with acute illness, the level of IL-8 increased both compared to normal (P<0.001) and EKBB (P<0.01), attracting neutrophils to the inflammatory site, being part of systemic immune responses, which can damage tissues and increase airway obstruction.

A higher level of IL-10 - 33.12 ± 0.70 pg / ml, compared to the control group in children with acute obstructive bronchitis, in addition to positive anti-inflammatory effects (suppressing the production of inflammatory cytokines, helps to eliminate inflammation), may be involved in suppressing the activation of immune cells, as a result of which negative consequences lead to complications and long duration of the disease can come

The serum content of TNF-α, which is responsible for early cytokine reactions and is responsible for the direct defense of the organism against the virus, was statistically significantly higher in children with acute obstructive bronchitis -32.16 ± 0.70 pg / ml compared to children in the control group (P < 0.01), and at the same time, it was associated with inflammatory processes and the immune system. responds to participation in the pathogenesis of the disease.

Studies have shown that interleukins play an important role in the pathogenesis of the disease in children with acute obstructive bronchitis, and their level can serve as an indicator of the severity of the disease. studying the dynamics of interleukins in a group of children who get sick quickly is necessary for the development of new methods of diagnosis and treatment of acute obstructive bronchitis.

Immunological markers of acute obstructive bronchitis were high levels of anti-inflammatory (IL-1 4.8 times, IL-4 2.6 times, IL-10 2.2 times) and inflammation-specific (IL-6 1.1 times, IL-8 1.9 times, and TNF-α 1.2 times) classes of interleukins compared to normal values (P<0.01, P<0.001). It was found that it can be, which indicates the importance of pathogenetic mechanisms of the inflammatory process in Bronchoobstructive syndrome and the importance of suppressing the mechanisms of the immune state.

Summary. The study showed that cytokines are one of the main mediators of pathogenesis and regulate the activation of immune cells and inflammatory processes in the respiratory tract. Understanding the role of cytokines in obstructive bronchitis in children can provide insight into disease mechanisms, course characteristics, and potential diagnostic and therapeutic measures. It was revealed that in children with obstructive bronchitis from the group of frequently ill patients, there is an increase in the level of inflammatory markers C-reactive protein and procalcitonin by 1.3-1.5 times in comparison with children not from the group of frequently ill patients.

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