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## IMMUNOLOGICAL DYNAMICS OF RECURRENT RESPIRATORY INFECTIONS IN FREQUENTLY SICK CHILDREN ON THE BACKGROUND OF IMMUNOCORRECTIVE THERAPY

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**Abstract:** The article provides data on the developed new scheme of immunocorrective therapy, which provides for the combined use of the bacterial lysate Broncho-Munal and the adjuvant sodium nucleinate in the complex treatment of recurrent respiratory infections in frequently ill children. The positive effect of the developed method of treatment was manifested in an increase in the indices of nonspecific, that is, bacteriostatic activity of blood serum, phagocytic system, complement, adhesion ability of erythrocytes and specific factors with the formation of anti-staphylococcal antitoxic immunity in a short time.

**Keywords:** frequently ill children, immunological parameters.

### Introduction

The last decade has been characterized by the study of the characteristics of the immunological status of frequently ill children and attempts to develop criteria for the diagnosis of its disorders.

According to the literature, changes in the immune status in BWD are very diverse, but many of them indicate not an immunodeficiency, but only the peculiarities of the immune response to infection. Repetitive respiratory tract infection has been reported to lead to dysfunction of the immune system [6]. The study of immunity factors in BCD revealed a decrease in the content of immunoglobulins in the blood serum [5], a decrease in the level of T-helpers, interferons [1,7], the relative and absolute number of CD3, CD4, CD16 [3], a decrease in the function of phagocytes [2]. There are few works devoted to the mechanisms of nonspecific factors of the body's defense in CWD [4]. Meanwhile, this problem is extremely important in theoretical and practical terms, since it concerns the first stage of interaction between a macro- and microorganism, on which the outcome of the process depends to a certain extent, i.e., the development of infection.

The development of new methods of treatment and their introduction into practical medicine contribute to the rapid recovery of the growing generation, the improvement of the

material condition in the family and is of economic importance for the State.

**Purpose of the study:** to develop a new scheme of immunocorrective therapy, which provides for the combined use of the bacterial lysate Broncho-munal and the adjuvant Sodium Nucleinate in the complex treatment of recurrent respiratory infections (RRIs) in frequently ill children (BCD).

**Research methods:** the immunological parameters of 146 frequently ill children, from 1 to 6 years old, hospitalized in the pulmonology department of the City Children's Hospital No. 1 in Samarkand were studied, of which 46 were treated with the traditional method (T), 50 - with the traditional method using Broncho-Munal (TB) and 50 by the traditional method using Broncho-Munal and the adjuvant Sodium Nucleinate (TBN). The studies were carried out before treatment (146) and in dynamics before discharge from the hospital (146).

**Results and discussion.** The positive influence of the developed method on the immune status of BWD was assessed by dynamic study of nonspecific factors of the body's defense.

The study of bacteriostatic activity of serum (ALS) before treatment shows that it manifested itself in dilutions of 1:10 (82.6%), 1:20 (15.2%) and 1:40 (2.2%). After traditional

treatment, the ALS level did not change significantly (Table 1).

Table 1

The level of bacteriostatic activity of the serum BWD against the background of immunocorrective therapy, abs. %

Treatment method	Term	Serum dilution							
		1:10		1:20		1:40		1:80	
T, n=46	Before	38	82,6	7	15,2	1	2,2		
	After	32	69,6	11	23,9	3	6,5		
ТБ, n=50	Before	35	70,0	11	22,0	4	8,0		
	After	11	22,0***	26	52,0***	13	26,0*		
ТБН, n=50	Before	41	82,0	8	16,0	1	2,0		
	After	8	16,0***	10	20,0	16	32,0***	16	32,0

Note. \* - Differences relative to the group data before treatment are significant (\* - P <0.05, \*\*\* - P <0.001).

After complex therapy with Broncho-Munal, higher dilutions were detected. Before treatment, the amount of sera with bacteriostatic activity in dilutions of 1:40 was noted in 8% of cases, after treatment - in 26%. In group 3 patients after treatment, the ALS level increased to 1:80 in dilutions. If before treatment ALS was manifested in dilutions of 1:40 in 2%, then after treatment such activity was recorded in dilutions of 1:40 in 32%, and in 1:80 in 32%.

The indicators of the functional state of the phagocytic system in the dynamics of various methods of treatment in CWD are shown in Table 2. Indicators of phagocytosis activity (AF), phagocytosis index (IF) and phagocytosis completeness (DF) indicate the advantage of immunocorrective treatment. If the average AF index in the traditional method after treatment is 42.5, then after TBI it reaches 49.1. Similar results were obtained in the study of IF (T - 4.1, TB - 4.6, TBN - 4.9).

Table 2

The functional state of the phagocytic system in dynamics when using various methods of treatment in CWD

Treatment method	Phagocyte function		Phagocytosis completeness				
	AΦ	ИФ	I 10-9 score coeff.	II 8-7 score coeff.	III 6-5 score coeff.	IV 4-1 score coeff.	
T, n=46	Before	40,2±0,24	3,6±0,16	8 0,87±0,00	17 0,62±0,022	16 0,39±0,009	5 0,31±0,00
	After	42,5±0,19***	4,1±0,15*	12 0,94±0,024**	24 0,72±0,025**	10 0,42±0,011	-
ТБ, n=50	Before	40,3±0,23	3,3±0,16	8 0,87±0,000	21 0,66±0,016	18 0,39±0,008	3 0,31±0,000
	After	45,8±0,12***	4,6±0,12***	18 0,91±0,020	20 0,74±0,02**	12 0,42±0,008	-
ТБН, n=50	Before	40,2±0,21	3,5±0,15	9 0,87±0,00***	14 0,64±0,017	23 0,39±0,008	4 0,31±0,000
	After	49,1±0,30***	4,9±0,18	21 0,93±0,017	25 0,78±0,01***	4 0,44±0,00***	-

Note. Grade DF I - high; II - medium; III - low; IV - very low; \* - differences relative to the group data after treatment are significant (\* - P <0.05, \*\* - P <0.01, \*\*\* - P <0.001).

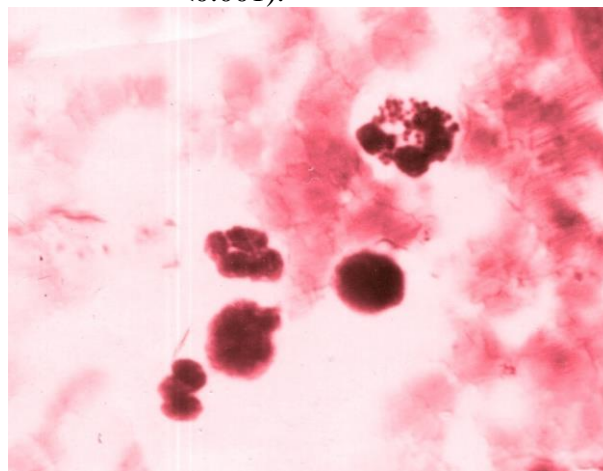


Fig. 1. Increased phagocytosis after TBN treatment.

The study of the completeness of phagocytosis shows that before treatment, the lowest degree of DF was noted in all groups. After treatment, the digestive ability of phagocytes increased. In children of the 3rd group, after treatment (TBN), the high degree of digestive ability of phagocytes reached the maximum level, that is, it was registered in 21 (42.0%) of 50 BWDs. In other groups, a high degree of TB was found in 36% of the surveyed, T - in 26.1% (Fig. 1). The complement system refers to nonspecific defense factors, but is involved in specific forms of response to foreign substances. Complement binds to incomplete antibody molecules, allowing the lysis of the antigen. An increase in the amount of complement is observed with all methods of

treatment (T - up to 51.8 units, after 57.1 units, TB - 50.7 and 60.7 units, respectively).

However, the highest rates were recorded in patients of the 3rd group, who received complex therapy with the appointment of Broncho-Munal and the adjuvant Sodium Nucleinate. If before treatment the amount of complement was 50.3 units. then after treatment it reached 65.7 units. (Table 3). The immune response (RIP) of erythrocytes reached (19.1-21.4) with two methods of treatment (TB and TBN) (Fig. 2).

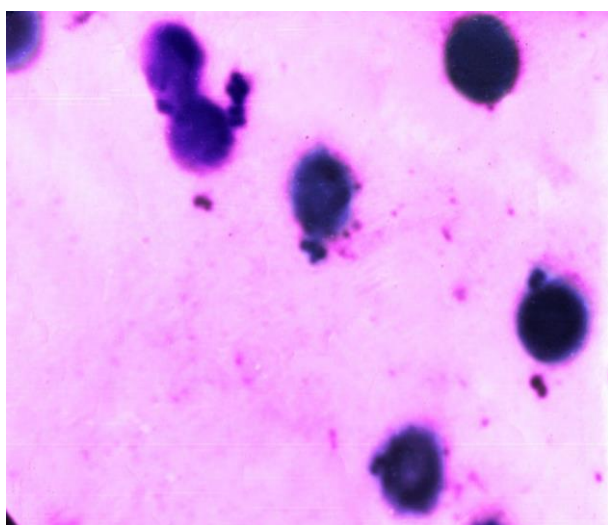


Fig. 2. Increasing the adsorption capacity of erythrocytes in BWD with TBN.

Table 3

Parameters of specific and nonspecific protection in BWD in various methods of treatment

Treatment method	Indicator of non-specific protection and specific antibodies			
	complement units (C <sub>H50</sub> )	ПИИ	staphylococcal antitoxin (AE)	
T, n=46	Before	51,8±1,24	12,6±0,15	0,33±0,05
	After	57,1±1,11***	15,1±0,19***	0,73±0,05***
TB, n=50	Before	50,7±1,25	12,6±0,13	0,38±0,05
	After	60,7±0,87***	19,1±0,26***	0,76±0,09***
TBN, n=50	Before	50,3±1,31	12,4±0,12	0,25±0,03
	After	65,7±0,84***	21,4±0,47***	1,45±0,14***

Note. \* - Differences relative to group data after treatment are significant (\*\*\*) - P < 0.001.

The antitoxin content in 1 ml of blood serum in children in the traditional method

before treatment is  $0.33 \pm 0.05$  AE, after treatment it reaches  $0.73 \pm 0.05$  AE. With the use of Broncho-munal against the background of basic therapy before treatment  $0.38 \pm 0.05$  AE, after  $0.76 \pm 0.09$  AE. A clear increase in antitoxic immunity is observed with the use of Broncho-Munal and Sodium Nucleinate. So, if before treatment the average titer is  $0.25 \pm 0.03$  AE, and after treatment  $1.45 \pm 0.14$  AE.

Thus, the positive effect of the developed method of treatment was manifested in an increase in the indices of nonspecific and specific factors with the formation of antitoxic immunity in a short time.

### Conclusions:

1. The combined use of Broncho-Munal and Sodium Nucleinate has a more stimulating effect on ALS. The dynamic increase in ALS as a result of different methods of treatment, apparently, occurs due to the accumulation of active proteins, which have a suppressive effect on the growth and reproduction of bacteria. Based on the foregoing, ALS can be used as a criterion for assessing the immunological status of BWD.

2. After immunocorrective therapy in complex treatment, the metabolism in leukocytes improves, the formation of lysosomes is accelerated, and the amount of lysozyme in them increases. This leads to an increase in the digestive capacity of phagocytes.

3. With the combined use of Broncho-Munal and the adjuvant sodium nucleinate, the titer of antitoxic immunity increases (1.45 AE). Sodium nucleinate introduces its RNA fragment into the ribosomes of plasma cells, and antitoxin is synthesized against those toxins that are in the child's body.

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