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Relation of the immunologic status of blastocystosis patients with the effectiveness of their therapy

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ABSTRACT

To study the presence of a relationship between the state of immunologic homeostasis and the effectiveness of blastocystosis therapy, the values of immunity indices were compared in 300 patients with blastocystosis in alternative groups: group A − with good therapeutic effect (n = 162) and group B − with satisfactory effect (n = 138). Group A included patients who had an overall clinical symptom regression rate of ≥33% after 1 month of treatment, and group B included patients who had an overall regression rate of ≤32%. When comparing the correlation structures of immunity indices in the groups, it was found that they differ significantly (by 90%) in their "portrait" properties (nature of correlation). In patients with a good therapeutic effect in comparison with the alternative group is characterized by a more pronounced antibodyalogenesis of all classes of antibodies (Ig M, Ig A, Ig G and IgE), which indicates their leading role in the formation of protective reactions in patients with blastocystosis. The established significant (90%) differences in the nature of relationships in the groups indicate that in patients depending on the effectiveness of their therapy, fundamentally different pathogenetic matrices of immune homeostasis are formed, which substantiates the possibility of using immune indicators as predictors.

1. Introduction

The immune system of the human body plays a leading role in protection against characteristic reactions, including blastocystosis. Therefore, it is impossible to exclude its role in relation to the effectiveness of therapy of blastocystosis patients.

2. Purpose of the work

To determine the presence and nature of the relationship between the state of immune homeostasis of the organism of patients with blastocystosis and the effectiveness of their therapy.

3. Materials and methods

To determine whether there is an association between immune parameters and the effectiveness of blastocystosis therapy, 300 blastocystosis patients aged 15 to 48 years who received complex therapy were

analyzed. The degree of regression of clinical symptoms in general after 1 month from the beginning of treatment was used as a criterion of therapy efficacy. To justify the comparison of patients into the group with good or satisfactory effect, the distribution curve of patients according to the regression index of clinical symptoms was previously analyzed. It was found that the distribution curve is non-normal and has a double-hump character. In this case, the mode of its first part is shifted to the left (regression degree 0%), and the second part - to the right (40-60%). The demarcation point between these two groups of patients is the regression value of 30-31%. In this regard, patients with ≥31% regression of clinical symptoms (group A) and ≤30% regression of clinical symptoms (group B) were included in the group with good therapeutic effect.

Statistical analysis was performed using the φ*-Fisher's angular transformation method [6].

4. Results and discussions

Analysis of the values of immunologic indices in the groups (Table 1) revealed reliable differences in most of them.

Table 1 Distribution of patients in groups according to the values of immunity indicators

Indicators	Indicator gradations	Group A		Group B		P
		Absolute indicator	%	Absolute indicator	%	
CD3, %	≤ 30	0	0	36	26,1	< 0,001
	≥ 31	162	100	102	73,9	< 0,001
CD19, %	≤ 30	90	55,5	36	26,1	< 0,001
	≥ 31	72	44,5	102	73,9	< 0,001
T-active lymphocytes, %	≤ 15	132	81,5	72	52,2	< 0,001
	≥ 16	30	18,5	66	47,3	< 0,001
CD8, %	≤ 19	72	44,4	42	30,4	< 0,05
	20-25	24	14,8	72	52,2	< 0,001
	≥ 26	66	40,8	24	17,4	< 0,001
CD4, %	≤ 30	48	29,6	60	43,4	< 0,01
	≥ 31	114	70,4	78	56,6	< 0,01
IRI	≤ 1,5	72	58,2	30	65,2	> 0,05
	≥ 1,6	90	41,8	48	34,8	> 0,05
CICs mo/mL	≤ 70	66	40,7	24	17,4	< 0,001
	≥ 71	96	59,3	114	82,6	< 0,001
Ig G, g/l	≤ 20	72	44,4	132	95,7	< 0,001
	≥ 21	90	55,6	6	4,3	< 0,001
Ig A, g/l	≤ 8,0	78	48,1	126	91,4	< 0,001
	≥ 8,1	84	51,9	12	8,6	< 0,001
Ig M, g/l	≤ 1,6	66	40,7	96	82,6	< 0,001
	≥ 1,7	96	59,3	42	17,4	< 0,001
Ig E, μg/l	≤ 200	120	74,0	126	91,4	< 0,001
	≥ 201	42	26,0	12	8,6	< 0,001

Thus, in patients with a good therapeutic effect significantly more often than in the alternative group, a slight decrease or normal number of CD3 (1,35 times, p < 0,001), a normal (≤ 30%) content of CD19 (2,1 times, p < 0,001), a decrease (≤ 15%) of T-active lymphocytes (1,6 times, p < 0,001) were determined, normal number of CD4 (1,2 times, p < 0,01), increased (≥ 26%) number of CD8 (7,4 times, p < 0,001), normal CICs (2,4 times, p < 0,01), and increased levels (≥ 21 g/l) of Ig G (12, 9 times, p < 0,001), Ig A (≥ 8 g/l, 5,8 times, p < 0,001), Ig M (≥ 1,7 g/l, 3,5 times, p < 0,001) and a very significant (≥ 200 μg/l) increase

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in Ig E levels (3 times, $p < 0,001$).

No significant differences were found only in terms of immunoregulatory index (IRI) values ($p > 0,05$).

Consequently, patients with a good therapeutic effect are characterized by a more pronounced antibodylogenesis of all antibody classes than in the alternative group. This appears to be due to the fact that in the presence of the parasite, the Fc fragment of Ig E and Ig G binds to eosinophils on the parasite surface, resulting in their degranulation followed by extracellular cytolysis of the parasite [7]. This is also supported by the fact that the proportion of patients with significant (≥7,6) eosinophilia was 3 times higher ($p < 0,001$) than that of the alternative group in the good-effect patients.

The system analysis of immune indices in groups by the method of correlation structures [8] showed that the nature of connections between indices differs very significantly (by 90%) in groups. It follows that the compared groups of patients form fundamentally different pathogenetic migrations of immune resistance of the organism, which ultimately affects the effectiveness of treatment.

As for the system-forming indicators of the compared correlation structures, i.e. indicators forming the largest number and the closest correlations with other indicators, they turned out to be identical for both structures, namely, Ig E. The obtained results about the unity of system-forming features of the compared correlation structures confirm the above-mentioned position about the leading role of Ig E along with eosinophils in antiparasitic defense.

5. Conclusions

For the majority (except for IRI) of immunologic indices, reliable differences between the groups were revealed, which allows to use them for the purpose of predicting the effectiveness of therapy in patients with blastocystosis.

Patients with good therapeutic effect in comparison with the alternative group are characterized by a more pronounced antibodyalogenesis of all classes of antibodies. which indicates their leading role in the formation of protective reactions of the organism in patients with blastocystosis.

Very high (30%) differences of correlation structures in groups in relations of the nature of correlations between immunologic indices were established, indicating that patients with different efficacy of blastocystosis therapy have fundamentally different pathogenetic matrices of immune resistance.

In patients with good therapeutic effect, a close direct correlation ($p < 0,001$) between high (≥ 201 μg/l) Ig E levels and eosinophil counts (≥ 7%) was observed, indicating an important role for the interaction between eosinophils and Ig E in the antiparasitic defense in blastocystosis.

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