

ИММУНОЛОГИЧЕСКАЯ РЕАКТИВНОСТЬ ОРГАНИЗМА ПРИ ОПИЙНОЙ НАРКОМАНИИ

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Резюме. В связи с общей тенденцией изменения реактивности при многих экзогенных и эндогенных заболеваниях, в настоящее время все большее внимание уделяется изменению иммунологической реактивности при наркомании. Целесообразность оценки состояния иммунных механизмов при опиийной наркомании определяется необходимостью прогнозирования их течения и исхода. Цель исследования – изучение иммунологической реактивности организма у больных опиийной наркоманией в состоянии абстиненции. С этой целью были проведены клинико-иммунологические исследования у 80 больных, употребляющих препараты опиийной группы. Длительность заболевания колебалась в пределах 0,5-19 лет. Из них давность заболевания до 3 лет – у 28 больных (I группа), а свыше 3 лет – 52 больных (II группа). Количество исследуемых в контрольной группе составляло $n = 50$. Была проведена оценка психического, наркологического, соматического, неврологического статуса. Исследованы общие клинические, биохимические и иммунологические показатели. В результате данного исследования, было установлено, что у больных I группы наблюдалась более выраженная Т-лимфоцитопения. Выявлено стойкое повышение величины сывороточного IgM как в динамике абстиненции, так и в зависимости от давности заболевания, что может говорить о напряжении гуморального звена иммунитета при опиийной наркомании. Кроме того, по мере увеличения длительности хронической наркотизации отмечается тенденция к повышению относительного количества В-лимфоцитов. Таким образом, можно сделать такие выводы, что у больных опиийной наркоманией в состоянии абстиненции развивается Т-лимфоцитопения; с увеличением длительности заболевания наблюдается повышение в 2-2,6 раза уровня IgM; выявленные изменения иммунологической реактивности организма предполагают необходимость включения иммунокорректирующей терапии в комплекс лечебных мероприятий при опиийной наркомании.

Ключевые слова: иммунологическая реактивность, опиомания, психиатрия и наркология, реактивность организма, опиийная зависимость

BODY IMMUNOLOGICAL REACTIVITY IN OPIOMANIA

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Abstract. Due to the general trend of changes in reactivity in many exogenous and endogenous diseases, more and more attention is currently being paid to changes in immunological reactivity in drug addiction. The expediency of assessing the state of immune mechanisms in opioid addiction is determined by the need

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to predict their course and outcome. The aim of the study was to study the immunological reactivity of the body in patients with opium addiction in a stage of abstinence. For this purpose, clinical and immunological studies were conducted in 80 patients who use opioid drugs. The duration of the disease ranged from 0.5-19 years. Of these, the disease duration is up to 3 years – 28 patients (group I), and over 3 years – 52 patients (group II). The number of subjects in the control group was $n = 50$. Authors carried out the assessment of the mental, narcological, somatic, and neurological status. In addition, they have studied the general clinical, biochemical and immunological parameters. As a result of this study, it was found, that patients of group I had more pronounced T-lymphocytopenia. A persistent increase in the value of serum IgM was revealed both in the dynamics of abstinence and depending on the duration of the disease, which may indicate a strain on the humoral link of immunity in opium addiction. In addition, as the duration of chronic narcotization increases, there is a tendency to increase the relative number of B-lymphocytes. Thus, at the patients with opium addiction in a state of abstinence develop T-lymphocytopenia. Moreover, with an increase in the duration of the disease, an increase in the level of IgM by 2-2.6 times. The revealed changes in the immunological reactivity of the organism suggest the need to include immunocorrective therapy in the complex of therapeutic measures for opium addiction.

Keywords: immunological reactivity, opiomania, psychiatry and narcology, organism reactivity, opiate addiction

Introduction

In connection with the general trend of changes in reactivity in many exogenous and endogenous diseases, more attention is now paid to changes in immunological reactivity during drug addiction. The feasibility of assessing the state of immune mechanisms is accounted for by the need to predict their course and outcome [2, 8].

A number of studies showed that patients with opium addiction have functional insufficiency of polymorphonuclear leukocytes and T-lymphocytes, a decreased percentage of peripheral blood T- and B-lymphocytes as well as macrophages; decreased natural killer cell activity and antibody-dependent cell-mediated cytotoxicity; autoimmune disorders are noted [2, 4, 7].

On the contrary, other studies showed increased absolute number of peripheral blood T-lymphocytes in drug addicts, and that both during the period of abstinence and period of remission IgM level and T-lymphocyte count were significantly increased [2]. In addition, recently a growing interest have been paid to detection of blood anti-morphine antibodies in opium addiction. A significant increase in the level of anti-morphine antibodies was not typical for other types of drug addiction [1]. A direct addiction between degree of absorption of complement by blood serums in the presence of morphine and severity of drug tolerance in patients with opium addiction was recorded [3].

The aim of the study was to study the immunological reactivity in patients with opiate addiction during state of abstinence.

Materials and methods

Clinical and immunological studies were carried out in 80 patients (64 males and 16 females) who use homemade opium group preparations. All 80 patients were injected with drugs intravenously, clinically diagnosed with stage 2 of the disease with

detailed clinical picture represented by a large drug addiction syndrome. The patients were hospitalized to narcological hospital. The age of the patients ranged from 15 to 40 years, the duration of the disease ranged from 0.5 to 19 years. Of these, the duration of the disease up to 3 years was observed in 28 patients (group 1), and over 3 years – in 52 patients (group 2). Assessment of mental, narcological, somatic, and neurological status was carried out. General clinical, biochemical and immunological parameters were studied.

Immunological studies were carried out dynamically: upon admission to the hospital, after 7 days and after 14 days along with ongoing withdrawal syndrome therapy. In the blood, T- and B-lymphocytes, subpopulations of T-cells, immunoglobulins of classes A, G, M were determined by a unified method. The control group consisted of 50 age- and sex-matched apparently healthy individuals.

Results and discussion

The results of examining parameters of cellular and humoral immunity in patients with opium addiction are presented in Table 1. Upon admission to the clinic, a decrease in T-lymphocytes by 24.4% was found compared to the control group ($p < 0.05$). Analysis of T-cell subpopulations in the examined patients revealed a 26.7% decrease in T-helper cells and by 37.5% in T-suppressors ($p < 0.05$). At the same time, there was an increase in the number of null cells by 25% ($p < 0.05$).

Assessing humoral immunity indices revealed that IgM level shifts were more informative, which increased by 2.5-fold than in the control group ($p < 0.05$), which agrees with the literature data.

According to some publications, an increased serum IgM level in opium addicts was more common than in other types of drug addiction, which, apparently, can serve as a hallmark of opium addiction [5]. Serum IgA and IgG levels showed no apparent deviation from normal values.

Despite the ongoing therapy of withdrawal symptoms on day 7 and 14, the body immunological

reactivity did not recover, while T-lymphocytopenia persisted, and decreased level of immunoregulatory T-cells was observed (Table 1).

We analyzed parameters of cellular and humoral immunity in opium addiction in a state of abstinence, depending on the duration of the disease.

The data shown in Table 2 revealed that patients in group 1 had more pronounced T-lymphocytopenia. A persistent increase in serum IgM level was found both dynamically during abstinence and depended on the duration of the disease, which may indicate the tension of the humoral immune arm in opium addiction. In addition, along with increasing duration of chronic anesthesia, there is a tendency to increase percentage of B-lymphocytes.

Taking into account the data on detected serum anti-brain antibodies in opium addiction, it can be assumed that, namely, anti-brain antibodies underlie increased level of serum IgM. It is known, that IgM exerting a high pathogenic potential reacted with polymorphonuclear leukocytes to promote development of local chronic antigenic stimulation of multilayered immune inflammation and can aggravate

destructive processes. The changes we described in some immunological parameters are consistent with the data of experimental studies showing that long-term administration of morphine to animals stimulates the formation of specific antibodies, which neutralize the pharmacological drug effects. This may indicate about importance of antibody formation in development of opiate addiction and suggest an important role of body immunological changes in development of drug addiction [6]. The latter is confirmed by studies showing that the appearance of high levels of antigen-specific cells and antibodies that bind neurotransmitters has a significant effect on the course of opium addiction. Summing up, we can say that patients with opium addiction in a state of abstinence develop T-lymphocytopenia; with increased duration of the disease, serum IgM level increased by 2-2.6-fold; changes revealed in organism immunological reactivity suggest a need to include immunocorrective therapy in the set of therapeutic measures for opium addiction.

TABLE 1. INDICATORS OF CELLULAR AND HUMORAL IMMUNITY IN PATIENTS WITH OPIUM ADDICTION IN A STATE OF ABSTINENCE (M±m)

Indicators	Control group, n = 50	Experimental group, n = 80		
		Upon admission to the hospital	7 th day	14 th day
T-lymphocytes (%)	53.1±1.5	40.17±2.86*	42.0±4.9*	34.5±6.1*
B-lymphocytes (%)	10.2±0.9	12.30±1.29	10.3±1.3	8.8±1.8
O-cells (%)	36.60±1.97	45.8±2.7*	30.9±4.4	31.5±5.7
T-helpers (%)	42.30±1.31	31.00±2.18*	23.3±4.4**	30.6±3.9*
T-suppressors (%)	18.70±0.62	13.60±1.35*	11.30±1.54**	10.25±2.10**
Tx/Tc	2.70±0.17	2.9±0.3	2.5±0.4	1.9±0.4*
IgA (g/l)	1.76±0.18	1.71±0.16	1.79±0.16	0.8±0.2*
IgM (g/l)	0.90±0.07	2.3±0.2**	1.9±0.3*	1.01±0.50*
IgG (g/l)	8.38±0.58	9.6±1.2	8.7±1.4	10.7±2.2

Note. *, reliability of differences in relation to the control group – p < 0.05*, p < 0.001**.

TABLE 2. INDICATORS OF CELLULAR AND HUMORAL IMMUNITY IN OPIUM ADDICTION IN A STATE OF ABSTINENCE, DEPENDING ON THE DURATION OF THE DISEASE (M±m)

Indicators	Control group, n = 50	1 st group (up to 3 years), n = 28	2 nd group (over 3 years), n = 52
T-lymphocytes (%)	53.1±1.5	37.5±4.1*	46.2±2.7*
B-lymphocytes (%)	10.2±0.9	10.8±0.9	13.1±1.8
O-cells (%)	36.60±1.97	52.5±4.4*	42.6±3.2
T-helpers (%)	42.30±1.31	28.4±3.9*	31.8±2.5*
T-suppressors (%)	18.70±0.62	10.23±1.90**	15.7±1.6
IgA (g/l)	1.76±0.18	1.3±0.3	1.7±0.2
IgM (g/l)	0.90±0.07	1.9±0.3*	2.4±0.3**
IgG (g/l)	8.38±0.58	8.12±1.50	10.57±1.50

Note. *, reliability of differences in relation to the control group – p < 0.05*, p < 0.001**.

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References

1. Chechet E.A., Isaikin A.I., Chernenko O.A., Yakhno N.N., Savushkina I.Yu. Chronic inflammatory demyelinating polyradiculopathy and moderate cognitive impairment in a patient suffering from heroin addiction, infected with HIV and the hepatitis C virus. *Neurological journal*, 2014, Vol. 19, no. 2, pp. 38-46. (In Russ.)
2. Cossarizza A., Chang H.D. Guidelines for the use of flow cytometry and cell sorting in immunological studies (second edition). *Eur. J. Immunol.*, 2019, Vol. 49, no. 10, pp. 1457-1973.
3. Khasina M.A., Molochnikov V.O., Makhachkeeva T.A., Khasina M.Yu. Bioelements in the correction of dysmetabolic disorders in drug addicts. *Pacific Medical Journal*, 2015, Vol. 1, pp. 48-50. (In Russ.)
4. Kovalev I.A., Sharkova V.A. Clinical and immunological features of opium addiction. *Modern Problems of Science and Education*, 2016, no. 6. (In Russ.) Available at: <https://www.science-education.ru/ru/article/view?id=25622>.
5. Litvintsev B.S. Damage to the nervous system in drug addiction: features of symptoms and neurological complications. *Bulletin of the Russian Military Medical Academy*, 2015, Vol. 1, no. 49, pp. 95-100. (In Russ.)
6. Nevidimova T.I., Vetlugina T.P., Batukhtina E.I., Savochkina D.N., Naydenova N.N., Nikitina V.B., Lobacheva O.A., Menyavtseva T.A., Ivanova S A.A., Bokhan N.A. Features of cytokine production in addiction diseases. *International Journal of Applied and Basic Research*, 2015, Vol. 1, no. 1, pp. 49-51. (In Russ.)
7. Shatyрко M.A., Reshetnikov I.V., Golodny S.V., Mingazov A.Kh., Kozochkin D.A., Izarovsky B.V., Tselikman V.E. Features of changes in the immunogram and indicators of free radical oxidation of blood plasma in HIV-infected heroin addicts. *Kazan Medical Journal*, 2015, Vol. 96, no. 5, pp. 772-775. (In Russ.)
8. Tsygan V.N., Akperov E.K., Vostrikov V.V., Shabanov P.D. Immune dysfunctions in drug addicts and methods of their correction. *Reviews on Clinical Pharmacology and Drug Therapy*, 2007, Vol. 5, no. 4, pp. 2-81. (In Russ.)

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