

## Changes of Immune Response in Critical Situations after Treatment-protective Anesthesia

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### ABSTRACT

Anesthetic agents suppress the body immune status in critical condition, which can reveal itself in complicated forms like allergy, infections and etc. Immunological parameters were studied in 60 patients. 20 patients were not treated with treatment-protective anesthesia (I group). Second group - 20 patients, who were treated with treatment-protective anesthesia Dormikum (24-72 hours with the doze of 0.03-0,1 m.k.g/k.g.h). The other 20 patients - the third group, who were treated with treatment-protective anesthesia Tiopental Natria (24-72 hours with the doze of 4-8 m.kg/kg.h.) According to the results of the analysis we can establish that there were changes in the immune status of all patients, but Midazolam (Dormikum) has minimal immunosuppressive qualities than Tiopental Natria.

**KEYWORDS:** *immunosuppression, treatment-protective complications, critical situations*

Anesthesia suppresses immune response in the organism which can reveal itself in complicated forms like allergy, infections etc [1]. These mentioned complications are especially dangerous in critical situations because patients in this circumstance have reduced immune response [2].

Coming from the above said it is very important to work out a method of anesthesia, which won't cause unfavorable changes in the immune response of an organism. The purpose of the research was to work out methods of treatment-protective anesthesia, which would not have significant impact on immune response in critical situation of an organism.

### MATERIAL AND METHODS

60 patients were studied at the age varying from 20 to 65. Among them 15 patients had serious skull-brain trauma, 10 had traumas of thorax, 6 had abdominal traumas, 25 had poly-traumas and 10 had endo-toxic shock. The patients were divided by randomization method into 3 groups. The first group included 20 patients who were not treated with treatment-protective anesthesia. Second group included 20 patients who were treated with treatment-protective anesthesia Dormikum (Midazolamom). Anesthesia was conducted for 24-72 hours permanently with the help of Lineomat with the doze of 0.03-0,1 m.k.g/k.g.h. The third group included 20 patients who were treated with treatment-protective anesthesia Tiopental Natria. Anesthesia lasted 24/72 hours permanently with the help of Infusamat with the doze of 4-8 m.k.g/k.g.h.

Identical treatment was undertaken in each group with the exception of treatment-protective anesthesia. Research of the immune status was conducted according to the recommendations of I.M. Roitt (1988). The patients were examined at the 1st hour of their traumas and after 24-72 hours from the commencement of treatment. Certain subpopulations of T-lymphocytes (CD3, CD4, CD8) and B-lymphocytes and NK cells were conducted with monoclonal anti-bodies and methods of immunofluorescent. Immunoglobulin (A, M, J) was defined in the blood plasma with turbidimetric methods. The results were analyzed by statistic method and the research was conducted by a double blind model.

### RESULTS AND DISCUSSION

We can see from the table that during the first hour of critical situation among the patients of all groups immune suppression on the cell as well as on the humoral level, reduction of suppression activity of T-lymphocytes and reduction of concentration of T-helpers occurred. Reduction of phagocyte activity was also observed. Changes in the immunoglobulin of blood occurred. In the control group of patients of subpopulation of T-lymphocytes in 24-72 hours B-lymphocytes were insignificantly reduced and NK cells were slightly increased.

This indicates the fact that the patients in critical situation are characterized by immune depression. Under the effect of Midazolam immune status had slight changed. In particular, number of lymphocytes was changed insignificantly and NBT test indicator was slightly reduced. NK cells were reduced; subpopulation of the T-lymphocytes CD3, CD4, CD8 and CD4/CD8 had minimal changes though these changes were not reliable.

In the second test group where treatment-protective anesthesia Tiopental Natria was used in 24-72 hours increase of immune suppression was detected. In particular number of T- and B-lymphocytes and subpopulations of T-lymphocytes changed, suppressive activity and number of helpers decreased, level of phagocytes reduced, number of immune globulins in blood increased.

These changes are statistically significant to the cases of the third and the first groups. In particular the changes of B-lymphocytes, subpopulations, T-lymphocytes, their quantity and percentage of phagocyte are true, also number of NK cells and immunoglobulin G. Immunoglobulin A and M as well as indicators MBT test had insignificant changes.

Based on the analysis of the data we can draw the conclusion that Midazolam (Dormikum) has minimal immunosuppressive qualities. It is well known that Midazolam has wide therapeutic qualities, is compatible with other medicaments and eliminates fast from the organism. Treatment-protective anesthesia Midazolam (0.03-0,1 m.k.g/k.g.h) does not cause significant changes of immune status among patients in critical situation. The above said allows us to recommend Midazolam for treatment-protective anesthesia in critical situations.

Groups	Statistics	CD 3%	CD 4%	CD8%	CD4/CD8	B- lymphocytes	NK cells	Phagocytes number	Phagocytes %	NBT test		IgG g/l	IgA g/l	IgM g/l
										spontan	stimul.			
1st group before treatment	M	56,9	27,6	24,6	1,12	23,1	16,7	4,22	56,2	15	56,2	14,6	1,07	1,89
	±m	1,1	0,77	0,77	0,2	1,1	0,88	0,22	0,77	0,88	1,1	0,55	0,75	0,14
1st group 24-72 hours during treatment	M	56,5	26,2	24	1,09	24	16,9	4	55,8	15,8	55,7	16	1	2
	±m	1,12	0,8	0,8	0,25	1,3	0,9	0,3	0,8	0,9	1,12	0,61	0,81	0,14
	p1	>0.1	>0.1	>0.1	>0.1	>0.1	>0.1	>0.1	>0.1	>0.1	>0.1	>0.1	>0.1	>0.1
2nd group before treatment with dormicum	M	57	27,5	24,4	1,12	23	16,9	4	56,3	15	56	15,2	1	1,9
	±m	1	0,8	0,8	0,4	1	0,9	0,3	0,8	0,9	1,2	0,6	0,8	0,2
2nd group after treatment with dormicum 24-72 hours	M	56,8	26,5	25	1,06	23,6	16,6	3,9	56	15,5	56,5	16,5	1,02	2
	±m	1,15	0,7	0,9	0,3	1,1	0,8	0,2	0,7	0,8	1,3	0,5	0,7	0,15
	p2	>0.1	>0.1	>0.1	>0.1	>0.1	>0.1	>0.1	>0.1	>0.1	>0.1	<0,05	>0.1	>0.1
3rd group before treatment with thiopental	M	57	27,5	24,3	1,13	23,5	17	4,1	56	14,8	56	15,2	1,07	1,9
	±m	1,5	0,9	0,9	0,3	1,5	0,9	0,3	0,86	0,9	1,2	0,5	0,8	0,2
3rd group after treatment with thiopental 24-72 hours	M	54	25	27,4	0,9	26	14,9	3,2	52	16	55,2	17,5	1,1	2,2
	±m	1,16	0,8	0,7	0,25	1,2	0,1	0,4	0,81	0,98	1,1	0,6	0,9	0,15
	p3	<0,05	<0,05	<0,05	>0.1	<0,05	<0,05	<0,05	<0,05	<0,05	>0.1	<0,05	>0.1	<0,05
	p1/p3	<0,05	<0,05	<0,05	>0.1	<0,05	<0,05	<0,05	<0,05	<0,05	>0.1	<0,05	>0.1	<0,05
	p1/p2	>0.1	>0.1	>0.1	>0.1	>0.1	>0.1	>0.1	>0.1	>0.1	>0.1	>0.1	>0.1	>0.1
p2/p3	<0,05	<0,05	<0,05	<0,05	<0,05	<0,05	<0,05	<0,05	>0.1	>0.1	<0,05	<0,05	>0.1	>0.1

**Tab.1** Changes of immunological status.**REFERENCES:**

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## Зависимые от лечебно-защитного наркоза изменения иммунного ответа при критических состояниях организма

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### РЕЗЮМЕ

Анестетики подавляют иммунный ответ организма при критических состояниях. Это отражается в виде ряда осложнений, как аллергия, инфекция и др. Изучены показатели иммунной системы у 60 больных, находящихся в критическом состоянии. 20 больным не применяли лечебно-защитный наркоз, 20 - получали наркоз дормикума (доза 0,03-0,1 мг/кг в течение 24-72 часов); в остальных 20 случаях использовали тиопентал-натрия в дозе 4-8 мг/кг в течение 24-72 часов. Установлено, что наиболее выраженные изменения иммунного статуса больных обнаруживаются при использовании тиопентал-натрия.

**КЛЮЧЕВЫЕ СЛОВА:** иммуносупрессия, лечебно-защитный наркоз, критическое состояние