




The Immune Status Estimation In The Anesthesiologists And Critical Care Medicine Doctors


E. DAVITASHVILI, Z. KHELADZE
(CRITICAL CARE MEDICINE
INSTITUTE, TBILISI, GEORGIA).




The change of immune status caused by harmful professional factors (general anesthesia, be on duty etc.) were estimated in the critical care medicine doctors and anesthesiologists, which were conducted by the standard methods - calculating the quantity of T,B,D and Null-lymphocytes, T- suppressors and T- helpers. It was established that immune status of anesthesiologists and critical care medicine doctors authentically differed from those at the control group. The described changes also differed in various age groups.

Key words:


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Introduction

Anesthesiologists and critical care doctors in time of their work have long and repeated contact with such stress-factors as psycho-emotional and physical strains, inhalant anesthetics, infection antigens, X-ray or radiologic illumination and so on (Z. Kheladze., 1998).

By McName R. and others (1987) the main meaning of these hazardous factors has and

Physical psycho-emotional strain in time of using reanimation and anesthesiology measures. They pay attention to cumulative influence of gas-steamy anesthetics. Their unhealthy influence increases with age.


Scientists in the Birmingham Institute of Occupational Health(1987) have the opinion that the infection factors are also very dangerous for this specialty doctors, especially hepatitis B. By their opinion steamy anesthetics cause inactivation of vitamin B 12 and break synthesis of deoxyribonucleic acid, especially in leukocyte cells.

Singlair M.E. and others (1987) discovered antibodies against the hepatitis B surface antigens in 21 % of anesthesiologists and 2-3% hepatitis B virus carriers.


Kaptsov V.A. and others (1984) investigated health and work conditions of anesthesiologists and critical care doctors. They determined cardiovascular, nervous system, digestive tract and sense organs diseases. Frequency of cancer and allergic diseases is also high.

A.Spence (1987) investigations show, that those women, who work in operating rooms, have high risk of abortions and defect fetus birth.


On the other side organism steadiness against the different stress-factors mainly depends on the adequate react of the immune system (Haza C. et al, 1986, Krizhanovski G., 1985). For that reason, these risk-factors may cause changes of immune system in anesthesiologists and critical care doctors.



Shinde and others (1986) studied the immune system of operating rooms medical staff. Working time duration was about 5-10 hours. The following anesthetics were used : ether, halotan, nitrogen dioxide, trichlorethylene. Authors noted T -lymphocytes quantitative and functional activities decreasing. Changes of immune globulin concentrations were not observed (only one person had low concentration of immune globulin). 25% of doctors suffered with hepatitis B. The authors suggested to use effective measures against air pollution with inhalant anesthetic in operating rooms.




There are also data about decreasing immune reactivity in operating room medical staff (Zakorzhevski I.,1984, Buring J.E, 1985 and Salo M. et al, 1984).



There are lot of studies showing deep depression of a humoral system immune answer in time of using halotan and nitrogen dioxide inhalation. While using general anesthesia with halotan, about 3-4 hours duration concentration of this drug in anesthesiologists blood was about -1-19,5 mg/l.

These data have fragmentary character and they do not include anesthesiologists and critical care doctors real work conditions, age aspects and other factors, without this information we could not find out some recommendations.



The aim of this article was to find out peculiarities of immune answer changes in ~anesthesiologists and critical care doctors, taking into account their age, length of service, conditions and to work out according recommendations.

Materials and Methods

60 anesthesiologists and critical care doctors were studied: 31 anesthesiologists and 29 critical care doctors. There were two groups: 1) aged from 21 to 35 (32 doctors) and 2) aged from 36 to 60 (28 doctors).

Anesthesiologists were studied during a day or night before or after several (3-4) following operations. And critical care doctors were studied during a strain day or night before and after using reanimation measures.

Standard method of immune investigations was used (Rout A., 1999). In the peripheral blood defined T -, B-, D-, Null-lymphocytes, T-helpers and T-suppressors cells amount .

T -lymphocyte proliferative activity was estimated by reaction of blast transformation (Nowell; 1960), as nonspecific cell mitogen was used phytohemagglutinine. T -lymphocyte suppressor activity (Sampson D. et al, 1976) was determined in one way mixed cultures.

There was determined serum immune globulin main classes (A, M, G) concentrations by method of radial immune diffusion in gel by Mancini G. (1970).


For statistical treatment of our studies results we used machine program Matcad (Mathsoft Inc., One Kendale Square, Cambridge, MA 02139 (617) 5771017). Due to this program we could make histograms and integration law of distributions for each of research indexes. It also gives us the tables of frequency and probability meanings. Besides that difference probability (P) of middle arithmetical studied groups was determined by Student's table rate set deviation (t) meaning. Differences were statistically trustworthy in the interval $p < 0.05 - 0.001$ and doubtful in the interval $p > 0.5 - 0.1$.

Results and Discussion


In this investigation we have shown that immune status of anesthesiologists and critical care doctors in nonworking conditions is different from the immune answer indexes of practically healthy persons (donors). These differences have unequal character in different age groups (see table 1).

Namely, the studied group of doctors aged from 21 to 35 had statistically trustworthy ($p < 0.01-0.02$) decreased circulating T-lymphocyte absolute and relative amount. They had increased circulating D- and Null-lymphocytes amount ($p < 0.01$). Humoral immunity index change is statistically doubtful ($p > 0.5-0.2$).

Another studied group of doctors aged from 35 to 60 had changes on T-lymphocyte immune regulatory subpopulations level -with decreasing relative amount of T-helpers ($P < 0.01$), they also had increasing ($P < 0.001$) T-suppressors amount, that is why their subregulative lymphocyte correlation coefficient is deflected on T-suppressors side. Also depression of T-lymphocyte functional activity was observed ($P < 0.01$). Changes of other indexes of immune homeostasis is statistically doubtful ($p > 0.5-0.1$) comparing with donors in the same age group. Also it must be noted, that in some cases (in doctors aged from 31 to 35 15.6 %; and in doctors aged from 35 to 60 -20.4%) we had sharp undesirable changes of cell and humoral immunity.



After a hard working day anesthesiologists and critical care doctors had quantitative and functional depression of cell immunity indexes. But changes were more significant in persons united in the second age group (see table 2). Namely, there were decreased T-, B- and D-lymphocytes and rejected T-lymphocyte proliferative activity, also increased suppressor activity. This table also shows that statistically trustworthy changes of humoral immunity indexes were in persons united in the first group.



It is important to show that these changes had transient character in 79,6 - 84,4% . Most of the cases of such displacements of immune system we could not count as pathological. But somehow they are risk factors and may cause cancer, cardiovascular, gynecological, inflectional, allergic and autoimmune diseases.

Following above mentioned it is reasonable to conclude:

Anesthesiologists and critical care medicine doctors must submit rules-requirements of aseptic and antiseptic. It is necessary to limit use of diagnostic and medical means, which negatively influence on a condition of health.

For the selection of anesthesiologists and critical care doctors it's important to foresee their immune status.

For prophylactic measure of anticipated change in the immune response these doctors have to be inspected regularly and if necessary immune modulated treatment has to be done.

Table 1. Immune status Index in nonworking conditions

##	Studied persons groups		Absolute amounts of lymphocytes	T- lymphocytes		B- lymphocytes		D- lymphocytes		Null- lymphocytes		T- helper %	T- suppressor %
				%	cell/mkl	%	cell/mkl	%	cell/mkl	%	Cell/mkl		
1	Total	X±m n t p	1723,9±58,4 60 0,304 >0,5	53,4±0,8 60 2,08 <0,5	952±36,9 60 1,05 >0,5	16,3±0,7 60 0,7 >0,5	286,4±20,8 60 0,67 >0,5	2,1±0,1 60 2 <0,05	35,4±2,3 60 1,33 >0,2	28,0±1,1 60 1,86 >0,1	510,1±31,3 60 2,976 <0,01	34,4±0,6 60 3,077 <0,01	18,9±0,5 60 2,806 <0,01
2	First group	X±m n t p	1727,6±77,6 32 1,819 >0,1	58±0,9 32 5,47 <0,001	1065,5±41,5 32 3,446 <0,01	17,8±0,9 32 0,7 >0,5	322,3±28 32 0,2 >0,5	2,4±0,1 32 2,25 <0,05	43,7±3,1 32 1,43 >0,2	22,2±1,3 32 4,81 <0,001	397,9±28,3 32 3,59 <0,001	39,1±0,8 32 3,2 <0,01	18,9±0,5 32 0,8 >0,5
3	Second group	X±m n t p	1720,1±100,7 28 1,692 >0,2	48,7±1,0 28 0,1 >0,5	828,4±56,2 28 0,87 >0,5	14,7±0,9 28 0,4 >0,5	250,4±1 28 2,01 <0,1	1,7±0,2 28 0,7 >0,5	27,1±2,8 28 0,8 >0,5	35,5±1,3 28 0,2 >0,5	622,3±48,1 28 2,34 <0,05	29,6±1,3 28 3,243 <0,01	19±1,1 28 3,692 <0,001

##	Studied persons groups		Immunoglobulins, mg%			SI %	Suppressor activity, %
			A	M	G		
1	Total	X±m n t p	240,1±3,0 60 0,6 >0,5	107,5±0,7 60 0,1 >0,5	1187,3±5,1 60 0,4 >0,5	51,1±1,6 60 1,217 >0,5	22,7±0,5 60 1,6 >0,1
2	First group	X±m n t p	251,1±2,1 32 0,5 >0,5	108,1±0,9 32 1,4 >0,2	1221,5±5,2 32 0,96 >0,5	55±1,2 32 0,53 >0,5	24,1±0,7 32 1,33 >0,2
3	Second group	X±m n t p	229±6,0 28 0,63 >0,5	106,9±1,0 28 0,66 >0,5	1153±8,3 28 0,03 >0,5	47,0±0,9 28 3,353 <0,001	21±0,9 28 0,4 >0,5

2. Immune status Index after hard working day

##	Studied persons groups	Absolute amounts of lymphocytes	T-lymphocytes		B- lymphocytes		D- lymphocytes		Null- lymphocytes		T- helper %	T- suppressor %	
			%	cell/mkl	%	cell/mkl	%	cell/mkl	%	cell/mkl			
1	Total	X± m n t p _{1/1}	1443,5±60,7 54 3,33 <0,001	47±0,9 54 5,3 <0,001	683,8±31, 0 54 5,6 <0,001	15,6±0,5 54 0,8 >0,5	226,5±13, 6 54 2,4 <0,02	1,5±0,1 54 4,3 <0,001	22,5±1, 9 54 9,92 <0,001	36,4±1,0 54 5,03 <0,001	564,2±26, 2 54 1,33 >0,2	26,5±0, 8 54 4,6 <0,001	19±0,7 54 0,3 >0,5
2	First group	X± m n t p _{1/2}	1481,4±75 32 2,272 <0,02	49,2±1,3 32 5,5 <0,001	731,7±42, 2 32 5,6 <0,001	16,6±0,6 32 1,1 >0,5	245,2±17, 5 32 2,34 <0,02	1,7±0,1 32 7 <0,001	26,6±1, 3 32 4,4 <0,001	32,3±1,3 32 7,8 <0,001	479±34,8 32 1,81 >0,1	31±1,0 32 6,2 <0,001	18,2±0,9 32 0,7 >0,5
3	Second group	X± m n t p _{1/3}	1405,5±115 22 2,078 <0,05	44,8±1,0 22 2,8 <0,01	635,8±57, 5 22 2,5 <0,02	14,7±0,6 22 0,1 >0,5	207,7±19, 4 22 1,7 >0,1	1,3±0,2 22 1,3 >0,2	18,4±3, 3 22 2,02 <0,05	40,4±1,4 22 2,6 <0,02	649,4±4, 4,7 22 0,4 >0,05	22±1,1 22 2,71 <0,02	22,7±1,2 22 2,31 <0,5

##	Studied persons groups		Immunoglobulins, mg%			SI %	Suppressor activity, %
			A	M	G		
1	Total	X±m n t p	242,5±4,1 54 0,429 >0,5	111,2±1,1 54 2,846 <0,01	1192,5±5,2 54 0,71 >0,02	47,6±1,2 54 2,4 <0,02	122,8±0,7 54 0,1 >0,5
2	First group	X±m n t p	260±2,2 32 2,928 <0,01	112±1,5 32 2,29 <0,05	1220,5±5,5 32 0,1 >0,5	50,5±1,2 32 2,05 <0,05	23,3±0,8 32 0,7 >0,5
3	Second group	X±m n t p	224,9±6,6 22 0,461 >0,5	110,3±1,7 22 1,726 >0,1	1164±9,8 22 0,9 >0,5	44,7±1,7 22 2,42 <0,05	22,3±1,1 22 0,8 >0,5

იმუნური სტატუსის შეფასება ანესთეზიოლოგებსა და კრიტიკული მედიცინის ექიმებში

ე.დავითაშვილი, ზ.ხელაძე (კრიტიკული მედიცინის ინსტიტუტი, თბილისი, საქართველო).

შესწავლილია ანესთეზიოლოგებისა და კრიტიკული მედიცინის ექიმთა იმუნური სტატუსი ასაკის, სამუშაო სტაჟის და პროფესიული საქმიანობის (ნარკოზი, მორიგეობა და სხვა) გათვალისწინებით. შეფასებულია იმუნიტეტის როგორც უჯრედული ისე ჰუმორული კომპონენტები. შემთხვევათა 79.6–84.4% ნაჩვენებია სხვადასხვა სახის დარღვევები, რომლებიც უხშირესად ტრანზიტორული ხასიათის იყო და უხშირესად იმუნოკომპეტენტურ T-ლიმფოციტებსა და იმუნორეგულაციურ სუბპოპულაციებს მოიცავდა.



Thank you for your attention!

