The specificities of immune cells and humoral factors in bone marrow of patients in critical condition

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Studying of bone marrow during critical states began in our clinic in 2004. Interest was caused due to its actuality. Morphological and MRI studies of bone marrow were conducted. 27 adult patients were studied (20 men, 7 women). Critical state was caused by hemorrhagic stroke (10 patients), ischemic stroke (8 patients), polytrauma (4) and skull and brain trauma (5). All patients had infectious diseases (tracheobronchitis, sepsis, pneumonia, cystitis and etc.). All patients were on lung ventilation. Treatments were feeling the fluid volume, correction of metabolism, parenteral and enteral feeding, antibiotic therapy and conducting other traditional treatments of intensive therapy.

Key words: Immune cells, Humoral factors, Bone marrow.

In body with critical state it is studied the puncture morphology of bone cerebral and is defined the consistence of nitric oxide and peroxide-radicals.

It is established that during the critical condition of body, in bone cerebrals together with morphology changes takes place appearance of nitric oxide and peroxide radicals.

Actuality:

Bone cerebral is not studied during the critical states. Though, if we take into consideration, that critical state is often associated with hemorrhage, intoxication, inflammatory processes and with other pathology, consequently takes place quantitative and qualitative changes of myeloid elements, then existence of significant changes are not excluded.

Herewith, in critical patients various pathologic processes (global and local hippo-perfusion, endothelia injure, acidosis and etc) are related to oxygen and nitric reactive radicals predominance and irregular production, what possibly leaves significant footprint on critical conditions processes and helps in bone cerebral changes formation;

Material and methods:

There are examined adult patients of 27 years old (20 male and 7 female); critical condition was caused with hemorrhagic insult (10 patients), ischemic insult (8 patients) politrauma (4 patients); cranium heavy trauma (5 patients) all patients had after-effect contagion complications (trachea

bronchitis, sepsis, pneumonia, cystitis). All patients were under lungs artificial ventilation. A treatment was conducted with water deficiency replenishment and correction of metabolism, parentheral and entheral nutrition Antibiotic therapy and intensive therapy, other traditional arrangements.

Material for studies was taken from breast bone punctuate 2-3 breast bone spaces. Before taking the material there was conducted Kasirski's needle dehydration, because hydro fusion injures cellular elements. Taking into consideration that punctuate becomes ferment very fast, it is needed to dilute it very fast (to count cariosities) and for pattern preparation. Following treatment of punctuate pattern is done as it is done with blood pattern. First of all it is calculated the number of megakaryocytic. Punctuate dilution and calculation of megakaryocytic in bone cerebrals is done in Phuks-Rozentals calculation cell. Finally 1 MKL punctuate is multiplied on punctuate dilution (20) and divided on cell capacity.

Also it is conducted electronic-paramagnetic resonance analysis (EPR) nitric oxides definition was implemented by M.Gallegan and other methods. Cellular culture spectres registration was conducted on radio-spectre-meter PE -1307, which operates on frequency 9.77 Hr by modulation frequency 80 KHz liquid nitrogen temperature (-196 ºC).In order to define the free nitric oxidize is used spin-snare – natriumdiethyl-dithyo-carbonic (DETC) – sigma. (dozed by 10 mg 0.6 $X10^6$ on cell 0.5 ml in area) and Fe^{2+} citrate (0.5 mg $FeSO_4$. $6H_2O$+25mg citrate of atrium 10 mg 0.6 $X10^6$ on cell 0.5 ml in area) NO – Fe^{2+} - (DETC)2 complexes EPR spectres were defined with liquid nitric temperature on microwave frequency 20 mvt, concerning definition of peroxide-radicals (LOO) was used spin-snare-phenyl-tert – butyl neutron (PBN) (sigma) with doze 50g 0.6 $X10^6$ on cell 0.5 ml in area. The EPR spectre of LOO was defining on room temperature on microwave frequency 20 mvt.

Results and discussion:

From analysis it is evident that in the patients with critical condition bone cerebral cells in some medicine was revealed toxic graining in neytrophils. The results of the study is presented in tables N 1 and N 2 where it is seen , that in bone cerebral of patients with critical state, neytrophilsmyelocytis are in norm (8.4 ± 1.1) on the third day it decreases, (6.5 ± 1.8) but it still stays in the norm frames. It is marked the increase of the metalomietocitis (7.1 ± 0.5 – N 7.7 ± 0.7 P> 0.5) what is concerned on neytrophils segment nucleus, their amount 6 is in critical patients is augmented. (34.7 ± 1.4 – N - 36.4 ± 2.1 P> 0.5) the amount of neytrophils bacillus nucleus increases (12.6 ± 0.5 – N – 13.5 ± 0.7 P> 0.5) neytrophils is in the norm frame (0.96 ± 0.1 – N -1.4 ± 0.2 P> 0.1). Concerning lymphoid

elements, lymphocytes number is augmented (9.0 ± 0.6– N - 10 ± 0.7 P> 0.5). The numbers of monocitus do not change (1.3 ± 0.1– N – 1.3 ± 0.2 P> 0.5).

Table I:

#	Statistic figures	Neitrophilic myelocitus %	Neitrophilic Metamyelocitus %	Neitrophilic Bacillus-Nucleus %	Neitrophilic Segment-Nucleus %	Neitrophilic Promielocitus %	Eozenophilic Segment – Nucleus %	Lymphocits %	Monocitus %	BazophilicNormoblasts %
1	M ± m	8.4±1.1	7.1±0.5	12.6±0.5	34.7±1.4	0.96±0.1	2.4±0.2	9.0±0.6	1.3±0.1	2.0±0.4
	n	27	27	27	27	27	27	27	27	27
2	M ± m	6.5±1.8	7.7±0.7	13.5±0.7	36.4±2.1	1.4±0.2	1.7±0.2	10.0±0.7	1.3±0.2	2.1±0.5
	n	16	16	16	16	16	16	16	16	16
	t	0.901<0.5	0.698 <0.5	1.047 <0.5	0.6742.208 <0.5	1.964<0.1	2.473 <0.05	1.085 <0.5	0 <0. 5	0.640 <0. 5

Basophilic normoblasts are augmentatedin patients with critical conditions (2.0 ± 0.4– N – 2.1 ± 0.5 P> 0.5), it has to be remarked the significant decrease of policromathohilicnormoblasts. (4.6 ± 0.96– N – 2.1 ± 0.6 P> 0.005) the number of oxiphilicnormoblasts their quantity increases. (6.9 ± 0.7– N – 9.0 ± 0.4 P> 0.5) plasma is in the norm frames (0.8 ± 0.1– N – 1.0 ± 0.1) and the number of blastic cells (0.6 ± 0.04– N – 0.5 ± 0.1).

As to the Electronic – paramagnetic resonance analysis outcome, it is given in the table N 3:

Data of Bone Cerebral Electronic – paramagnetic resonance analysis during the critical conditions:

Table II:

#	Statistic figures	Policromatophililicnormoblasts %	Oxophilicnormoblasts %	Blastic cells %	Proeritroblasts %	Plazmocists %
1	M ± m	4.6±0.96	6.9±0.7	0.6±0.04	0.4±0.2	0.8±0.1
	n	27	27	27	27	27

2	M ± m n t	2.1±0.6 16 2.208 <0.05	9.0±0.4 16 2.605>0.05	0.5±0.1 16 1.0>0.5	0.7±0.1 16 3.7<0.01	

Table III:

#	Patients Category	Statistic figures	NO	LOO
1	Patients in critical condition, Day I	M ± m n	18.1 ± 5.4 10	4.0±0.3 10
2	Patients in critical condition, Day II	M ± m n t	13.4 ± 1.1 4 0.853>0.5	1.3±0.4 4 5.4<0.01

As it is seen according to the table above during the critical condition takes place appearance of nitric oxides' and peroxide-radicals. (NO – 1.8 ± 5.4 and LOO – 4.0 ± 0.3) this similarly indicates existence of oxidation stress (peroxidation) in critical patients, what gives hand to the development of apoptosis. After treatment, on the third day is marked decrease of the nitric oxide radicals. (13.4 ± 1.1 P> 0.5) and also significantly decreases the level of peroxide-radicals (1.3 ± 0.4 P<0.01).

Materials and methods:

There were investigated 30 patsients (100 %) in critical condition. Clinical description of the patients is given in table # 1. Female were 11. Male-19 and age of patients was above 40 years. In 10 cases the critical condition was associated with an ischemic stroke. 7- with hemorrhagic stroke. 3-with postreanimation disease.4-with pneumonia.2-with polytrauma.2-with cardiogenic shock and 2-with cranial trauma.

The management of critical condition was performing by state standard about treatment of critical condition (Z. khelidze 2002) which contains: the artificial ventilation of lungs. Recovering blood circulation, correction of acid-base balance, water and electrolytic balance, analgesic and sedation antioxidant and antibacterial therapy and other medical events.

The special methods of research are presented as studding a number of bone marrow and peripheral blood stem and immune competent cells. In time of research of stem and immune

Cells in the heparinzed bone marrow and peripheral blood we were studying CD3, CD4, CD8, CD34, CD72.

In table #4-5 are given the data of changes of examined cells (CD3, CD4, CD8, CD34 and CD72) after treatment by electrical impulses in bone marrow and peripheral blood.

I N T E R L E I K I N					
#	*<4*	*<6*	*<8*	*<10*	*TNFi*
1	**2,5±0,2**	**75,6±4,4**	**76,4±15,3**	**10,4±1,0**	**12,0±1,6**
2	**3,6±1,0** **>0,005**	**36,7±4,2** **<0,001**	**89,4±12,2** **>0,05**	**12,0±1,4** **>0,005**	**6,2±1,6** **<0,05**

IMMUNOCOMPETENT CELLS %								
#	**CD_3%**	**CD_4%**	**CD_8%**	**CD_{34}%**	**CD_{72}%**	**gt m/l**	**gMm/l**	**Ggm/l**
1	**13,3± 0,1**	**8,2±0,8**	**5,7±0,003**	**2,0±0,01**	**6,0±9,6**	**2,1±0,8**	**1,6±0,4**	**12,3±3,0**
2	**16,5±0,1** **<0,001**	**10,6±0,006** **<0,001**	**6,9±0,005** **<0,001**	**2,3±0,03** **<0,001**	**8,9±0,006** **<0,001**	**4,0±0,1** **<0,05**	**2,7±0,1** **<0,05**	**26,3±1,9** **0,005**

იმუნური პასუხის უჯრედულ და ჰუმორულ ფაქტორთა ცვლილებათა თავისებურებანი კრიტიკულ ავადმყოფთა ძვლის ტვინში

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გასაღები სიტყვები: იმუნური უჯრედები, ჰუმორული ფაქტორები, ძვლის ტვინი.