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**Commit of progenic precursor cells: Use of electric current in critical condition**

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**Key words:** critical condition, electric current, progenic precursor cells, commite

**Reference:**

As a result of use of electric current a clear cut increase in quantity of marrow and peripheral blood cells erythrocytes as well as leucocytes and thrombocytes, especially of young cells takes place. Besides, the abovementioned increase stays stabile during the first couple of weeks of critical conditions. Parallel to the abovementioned increase the oxygen supply of bone marrow microenvironment and partial pressure of carbonic oxide and oxidation in the environment takes place. Considerable growth of progenic axial and immune competitive cells showing a tendency towards stability is significant as well. Having considered the abovementioned, decrease of accompanying complications, improving the indices of lethality and level of disability, shortening the time necessary to heal the patients and bring them out of the critical condition and back to health which means cutting down on treatment expenses as well is of big importance indeed.

**Actuality:**

Critical condition involves dystrophic changes and necrosis of separate areas of organs and tissues. Thus, today the goal of the treatment of critical condition is to save layers of non-necrosed undamaged cells and restore their functions. although any further progress can not be achieved without restoration of these areas. Until today, no purposeful arrangement of these processes has not been ever brought up. Furthermore, widely discussed issues regarding the reparation of pathological damages incurred as a result of various diseases by means of axial cells. Nowadays are represented in the form of transplantation of axial cells, subsequently the issue of commutation process of these cells has not been raised yet (Z. Kheladze 2007).

**Objectives and tasks:**

Management of the process differentiation of axial cells during critical conditions as a result of use of electric current.

## **Material and Methods:**

25,0 (100%) patients has been studied, 8,0(32,0%) women and 17,0(68,0%) men among them. Adults were represented by 6,0(24,0%), 14,0(56,0%) of puberty period, the aged and elderly – 5,0(20,0%). In 7,0(28,0%) cases critical condition was associated with ischemic insult, in 7,0(28,0%) cases – with hemorrhagic insult, in 3,0(12,0%) - with polytraumas, in 2,0(8,0%) with a heavy skull and brain trauma, in 2,0(8,0%) - with an acute sepsis, in 2,0(8,0%) - with a medicinal intoxication and in 2,0(8,0%) – with acute insufficiency of liver. When admitted at the clinic every patient was suffering from acute insufficiency of breathing and they have been kept on artificial ventilation from the very first hours. 1,0(4,0%) patients were under traumatic shock, 4,0(16,0%) under hypovolemic shock and 3,0(12,0%) patient under exotoxic shock, other patients have been suffering from acute insufficiency of blood-vascular system, besides at the different stages brain Tumefaction have been developed in 2,0(8,0%), in 3,0 (12,0%) patients - acute insufficiency of liver, in 10,0(40,0%) patients – respiratory distress syndrome of adults and in 2,0 (8,0%) - acute gastric ulceration. Infectious complications in 2,0(8,0%) has been associate with trachea bronchitis, in 13,0(52,0%) has been associate with bronchopneumonia and in 1,0(4,0%) – with acute sepsis and again in 9,0(36,0%) – with cystitis. When admitted at the clinic every patient was suffering from cerebral coma, the depth of which according to Glazgo scale were equivalent to 3-5 scores in 12,0(48,0%) patients, 6-8 scores in 7,0(28,0%) and 9-12 scores in 6,0(24,0%). When admitted at the clinic patients have been tested by using Apache-2 system, 11,0(44,0%) of patients gained 10-20 scores, 7,0(28,0%) patients 21-30 scores and 7,0(28,0%) – more than 31 scores. All the patients have been treated by using traditional methods, based on state standards for treatment of patients with critical conditions [Z.Kheladze 2002].

The abovementioned treatment included: anti-shock therapy, providing water and electrolytes, parenteral and enteral feeding, antioxidant therapy and other means. Parallel to the abovementioned these patients have been simultaneously treated with nitroglycerin (Zv.Kheladze and others 2008, Zv.Kheladze and others 2008, Zv.Kheladze and Z.Kheladze 2008). 9,7±4,3 bed-days were needed to bring the patients out of the critical condition and back to health. 8,0 (32,0%) passed away, deep disability have been developed in 4,0(16,0%) With comparatively low level of disability in 13,0 (52,0%) patients so that their life would not be depended on somebody else. A bed-day for these kind of patients constituted USD 303,1 i.e. equivalent of this amount in GEL. Control group study included 25,0 (100%) identical patients, all of them having been treated by using traditional methods, based on state standards for treatment of patients with critical conditions [Z. Kheladze 2002]. 12.4±3,0 bed-days were needed

to bring the patients out of the critical condition and back to health. Lethality index within this group amounted to 11.0 (44,0%), out of the 14,0 (56,0%) survived patients, 6,0 (42,0%) patients were suffering from high level of disability so that their lives would go on in an associated form only. Out of these patients chronic vegetative condition have been developed in 2,0 (14,2%) patients. The rest of patients 4,0(28,5%) could be able to live lives not dependent upon others, with comparatively low level of disability, a bed-day for these kind of patients constituted USD 390,6 i.e. equivalent of this amount in GEL. Special study methods conducted on these patients included: determining the number of marrow and peripheral blood cells, estimating the acid-alkali balance of punctuate of the marrow, determining the number of axial and immune competitive cells, carried out by using internationally acknowledged methods (Z.Kheladze2007).

### **Results and discussion.**

Outcome and assessment: the outcome of studying marrow cells in these patients, showed that after accomplishment of treatment by using combined method, chronologically coinciding the 4<sup>th</sup>-7<sup>th</sup> day of the critical condition, having been compared with initial indices (the 1<sup>st</sup>-3<sup>rd</sup> day of the critical condition), from the statistical point of view those populations of neutrophils including promyelocytes, myelocytes, meta myelocytes and bacillus-nuclear cells has been increased ( $P<0,001$ ). At a later stage of treatment by using a method, on the 8<sup>th</sup>-15<sup>th</sup> day of the critical condition compared to those revealed on the 4<sup>th</sup>-7<sup>th</sup> day, changes in other cells have not be considered statistically trustworthy ( $P>0,05$ ). Although by this time the given indices tend to decrease, compared to the indices existing before the treatment was begun (on the 1<sup>st</sup> – 3<sup>rd</sup> day), increase in their values still could be considered statistically trustworthy ( $P<0,001$ ).

Judging from this point of view, populations of eosinophils, basophiles, monocytes, macrophages, proerythroblasts, reticulocytes and plasmocytes have not been modified statistically trustworthy ( $P>0,05$ ). Judging on the basis of changes in peripheral blood cells that right after completion of treatment by using a method (on the 4<sup>th</sup>-7<sup>th</sup> day of the critical condition), having been compared with initial indices (the 1<sup>st</sup>-3<sup>rd</sup> day of the critical condition), the fact that the number of erythrocytes, leucocytes, among them rod-shaped leucocytes, lymphocytes and thrombocytes has been increased can be considered comparatively statistically trustworthy. Judging from this point of view, changes in other cells have not be considered statistically trustworthy ( $P>0,05$ ). It should be noted, that at a later stage after completion of treatment by using a combined method (on the 8<sup>th</sup>-15<sup>th</sup> day of the critical condition), number of peripheral blood cells compared to initial data (the 1<sup>st</sup>-3<sup>rd</sup> day of the critical condition), was still increased, although this difference could not be considered statistically trustworthy ( $P>0,05$ ). The difference distinguishing these data from the data recorded after completion of treatment by

using a method (on the 4<sup>th</sup>-7<sup>th</sup> day of the critical condition), was considered statistically trustworthy ( $P < 0,05$ ) as well. Significant changes have been discovered during the study of acid-alkali balance of marrow punctuate, increase in partial pressure of oxygen has been considered statistically trustworthy, the contents of “Basis Excess” has been significantly decreased in the punctuate of marrow, from this point of view changes in other indices of acid-alkali balance have not be considered statistically trustworthy ( $P > 0,05$ ). It should be noted that later after completion of the treatment, chronologically coinciding the 8<sup>th</sup>-15<sup>th</sup> day of the critical condition, changes in every parameter of acid-alkali balance, compared to the 4<sup>th</sup>-7<sup>th</sup> day of the critical condition and the 1<sup>st</sup>-3<sup>rd</sup> day of the critical condition, have not been considered statistically trustworthy ( $P > 0,05$ ). Changes in axial and immune competitive cells shows that after completion of the treatment by using a combined method (on the 4<sup>th</sup>-7<sup>th</sup> day of the critical condition) having compared to initial data (the 1<sup>st</sup>-3<sup>rd</sup> day of the critical condition), increase in the number of CD<sub>3</sub> ( $38,0 \pm 1,0\%$ ), CD<sub>4</sub> ( $29,5 \pm 1,1\%$ ), CD<sub>34</sub> ( $12,9 \pm 0,6\%$ ) and CD<sub>72</sub> ( $13,6 \pm 1,2\%$ ) has been considered statistically trustworthy ( $P < 0,05-0,001$ ). As for the changes in CD<sub>8</sub> population cells has been considered statistically trustworthy ( $P < 0,05$ ). It should be noted that later after completion of the treatment, on the 8<sup>th</sup>-15<sup>th</sup> day of the critical condition, the indices were high still, compared to the data recorded on the 1<sup>st</sup>-3<sup>rd</sup> day of the critical condition, although the difference could not be considered statistically trustworthy ( $P > 0,05$ ). The difference distinguishing the data recorded on the 8<sup>th</sup>-15<sup>th</sup> day of the critical condition from the data recorded after completion of treatment by using a method (on the 4<sup>th</sup>-7<sup>th</sup> day of the critical condition), was not considered statistically trustworthy ( $P > 0,05$ ) as well.

The analysis of the abovementioned data shows that as a result of a treatment with a method a significant increase in marrow and peripheral blood cells, erythrocytes, leucocytes, thrombocytes, especially young cells. This increase stays invariably high during the first and the second weeks, parallel to that oxygen supply to the brain and partial pressure is simultaneously increased, partial pressure of carbonic acid and acidity of the environment gets decreased. One should note as well significant increase in progenic axial and immune competitive cells, with a strong tendency to stability. Considerable decrease of complications accompanying critical conditions, lethality index, improvement of disability level, shortening the time needed to overcome critical conditions and cutting down on treatment expenses are of a really big importance as well.

**Literature:**

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**პროგნოზული პრეკურსორების კომიტირება: ელექტრული იმპულსების გამოყენება კრიტიკულ მდგომარეობათა დროს**

**კრიტიკული მედიცინის ინსტიტუტი, თბილისი, საქართველო**

ელექტრული სხივებით მკურნალობის შემდეგ ადგილი აქვს ძვლის ტვინის და პერიფერიული სისხლის უჯრედების ერთროციტული, ლეიკოციტური და თრომბოციტული ხაზის ახალგაზრდა ფორმის უჯრედების რაოდენობის მკვეთრმატებას, რომელიც სტაბილურად მაღალი რჩება კრიტიკული მდგომარეობის პირველი-ორი კვირის განმავლობაში. პარალელურად ძვლის ტვინში იზრდება ჟანგბადის პარციალური წნევა და გარემოს მჟავიანობა. საგულისხმოა აგრეთვე პროგნოზული ღერძული და იმუნოკომპეტენტური უჯრედების მკვეთრი ზრდა. ამ ფონზე შესაძინეია კრიტიკულ მდგომარეობათა თანმდევი გართულებების და ლეტალობის მაჩვენებლების შემცირება, ინვალიდობის ხარისხის გაუმჯობესება, აგრეთვე კრიტიკულ მდგომარეობათა ლიკვიდაციისათვის საჭირო დროის შემოკლება და მკურნალობის ღირებულების გაიაფება.