Critical Care Me dicine with limited recourses

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We were able to calculate differences between the treatments at the critical medicine service with restricted resources and nonrestrictive resources. We have following results: with restricted resources the treatment cost of one bed day is 218 $, while with non restricted resources the cost of one bed day in Georgia is 360-427 $, the difference is 141-209 $. Totally if the treatment in our case costs 1 030 511 $, it is 1 693 416- 2 013 245 $ with non restricted resources. The difference is 662 905- 982 737 $ which is a considerable amount. Also it is considerable that the lethality in the patients of both groups is 35%, and the length of patient's staying at the clinic is 4,5-4,6 days in both cases.

Key words: Critical Care**,** expensive parts, Georgian Medical Standards.

Introduction: Critical Medicine is one of the most expensive parts of health and price of a bed in a day for 24 hours is 200-600$ in different countries. Because it is expensive, critical medicine is still a wish for many countries. Especially for developing countries, where the majority of the world's population lives, and where patients are being cured without the help of critical medicine. The only solution to this problem is to make it cheaper. It's important to reduce the price existents and military attack, because the deficit in these situations is high. Although critical medicine organization is active in developed countries, which don't have a lack of recourses, but they need to be taught how to use them exactly.

Materials and Methods: They observed 1039 patients who are in critical situations. 29% women and 71% men, from other clinics are sent 29% and 71% from streets. After developing critical situation, only 50% are sent to a clinic within first three hours, during 12 hours 24%, in 24 hours 14%. After 72 hours 9%, 8% was until 16 aged people, 16-35 aged 25%, 35-60 aged 39%, more then 60 years old people -34%. The maximum age was 86 and minimum -15 (Table 1-2).

Table 1

	female	male	from streets	from other clinic	for age			
					until 16 age	16-35 age	35-60 age	more then 60 years
1039 100%	29%	71%	71%	29%	0.08%	25%	39%	34%

Table 2 Due to the time between the accident and administration to the hospital

	during 12 hours	in 12 hours	in 24 hours	after 72 hours
%	50%	24%	14%	9%

Maximum of the age was 86 years old and minimum 15 years old. . 27% of the patients had brain ishchemia and intracerebral hematoma, 11% had grave cranial trauma, 9% - had traumatic-hemorrhagic shock, 9% - exotoxic shock (among them intoxications caused by food, 8,9% - indifferent multi injuries (polytrauma),7% - acute respiratory failure, 5% - sepsis gravis (septic shock), 3.2 % undifferentiated critical conditions (brain cancer, acute porphyries and 0.09% and others), 2% - chronic obstructive pulmonary disease and asthma, narcotics and alcohol.), 2% status of epilepsy, 1.9% acute and sub acute hepatic failure (hepatargia), 1,4% diabetic coma. 1% - acute renal failure (uremia), 0.9% - myasthenia gravis 0.8% - cardiac shock, 0.4%- encephalitis, myelitis, encephalomyelitis (neuroinfections), 0.3 % anaphylactic shock, 0.3% - anoxic injury of brain (post resuscitation disease), 0.1% status of bronchial asthma, (table #3). 21 % of the patients had co-morbidities of Coronary artery disease, 5 % had diabetes mellitus, Chronic obstructive pulmonary disease 0, 02%, 1.4 % - chronic renal failure, 3%- cirrhosis hepatitis, 6%- pneumonia, 61.6% of the patients did not have co-morbidities. (Table # 4). During treatment, there were complications: 46% had bacterial tracheobronchitis, 27%- brain edema, 10% pneumonia, 2%- sepsis, 1.6%-toxic encephalopathy, 0.2%- ARDS, 0.1%- bleeding, 0.09%-acute renal failure. (Table #5)

Table3

№	nozology	Patients (%)	Bed-Days	letality
1.	Myasthenia Gravis	0,9		
2.	Exotoxic and endotoxic shock	9		
3.	Toxic encephalopathy	5		
4.	Traumatic shock. Anaphylactic shock	9,3		
5.	Status of bronchial asthma	0,1		
6.	Botulism	-		
7.	Guillain-Barre Syndrome	0,09		
8.	Heart Failure	0,8		
9.	Indifferent Multi Injuries (Poly trauma)	8,9		
10.	Eclam chirrosis psia	-		
11.	Encephalitis. Myelitis. Encephalomyelitis (Neuroinfections)	0,4		
12.	Status of Epilepsy	2		
13.	Anoxic Injury of Brain (Post resuscitation disease)	0,3		
14.	Brain Ischemia. (Ischemic Insult)	27		
15.	Acute Renal Failure (Uremia)	1,4		
16.	Diabetic Coma	5		
17.	Intracranial Injury (Grave Cranial Trauma)	11		
18.	Intracerebral Hematoma (Hemorrhagic Insult)	21		
19.	Cardiac Shock	0,8		

20.	Shock caused by Burn			
21.	Sepsis Gravis (Septic Shock)	5		
22.	Acute Respiratory Failure	7		
23.	Tetanus (Obstetrician Tetanus)	-		
24	Hypovolemic Shock (Hemorrhagic Shock)	9		
25	Undifferentiated Critical Conditions	3,2		
26	Acute and Sub acute Hepatic Failure (Hepatarga)	3		

Table 3 according to co-morbidities

	Coronary artery disease	Diabetes mellitus	Chronic obstructive pulmonary disease	Chronic renal failure	Cirrhosis, hepatitis	pneumonia
%	21%	5%	2,02%	1,4%	3%	6%

Table 4 Due to main complication

	sepsis	bacterial tracheobronchitis	pneumonia	Brain edema	Toxic encephalopathy	Bleeding	ARDS	Acute renal failure
%	2%	46%	10%	27%	1%	0,1%	0,2%	0,09%

The treatment process of the patients included artificial ventilation of the lungs in 49%. All patients were carried on regulation water and electrolytes balance, enteral and parenteral feeding, antioxidant and antibacterial therapy. If necessary treatment included brain edema, hemostasis therapy, vasopressors and cardio mimetic remedies. Blood and blood natural components, extracorporeal detoxication with plasmapheresis and hemodialesis, immune modulation therapy, therapy with plasma streams, life risking arrhythmia was treated by cardiac version, cardiac stimulation, and electro-defibrillation. Surgical operations were given if needed, for example: fixation of the broken bones, liquidation of bleeding, hemophneumothorax and damages of stomach organs, etc. Tracheotomy was given on the 7^{th} day in prolonged artificial ventilation of the lungs.
Total amount of the bed days was 4711. Treatment expenses were 1.030.511$ (1.648.850 lari, 1L=1.6$). The price of one bed day was 218 $ (350 lari). Above-mentioned amount of money was used for thorough treatment courses. Although it didn't include expanses for computer tomography. One examination of the tomography costs 93.7 $. Transcranial Doppler costs 62.5$, sonography – 31.2 $, ecocardioscophy- 43.7 $, also the price didn't include expenses for blood and blood natural components, red blood cells 0.1 l-9.5 $, fresh frozen plazma. – 0.1l – 11.2 $, bronchoscophy – 37.5 $, fibrogastroduodenoscopy-43.7$, tracheostomy-309.3$, surgical and traumatical operation: laparotomy, paracentesis, pleuracentesis and drain, ulcerorafia-882.5 $, liquidation of ileus – 1000.625$, stretching of broken bone-62,5$, osteosynthesis – 500-625 $. Because most of the patients don't have medical insurance in the country, their family members covered the expenses of treatment. 1677 bed days were not financed because of the patient's financial inability. It is 35.6% of total amount of bed days. These expenses were debts that could not have been paid due to poverty in the country.
Above mentioned group indicators ware compared with 1520 patients of the control group. Their treatment was held without restrictions of the recourses. In this group, the cost of one bed day was 360-427$.

Results and Discussions: The patient's one bed day in critical care department costs 218 $, which is spend by next direction:

1. Wage (Salary) Fund 17,1%
2. Income Tax 4%
3. Build Rent 5,7%
4. Communal (Municipal) Tax 1,4%
5. Examines (Researches. Analysis) 10,6%
6. Objects of Single Consumptions 8,0%
7. Oxygen Cylinder 18%
8. Medicine (Drugs) 30%
9. Profitableness 1,4%

The treatment is realized by Georgian Medical Standards, which is made for patients been in 27 kind of critical conditions by Acad. Z. Kheladze in 1996.

1. Myasthenia Gravis
2. Exotoxic and endotoxic shock
3. Toxic encephalopathy
4. Traumatic shock. Anaphylactic shock
5. Status of bronchial asthma
6. Botulism
7. Guillain-Barre Syndrome
8. Heart Failure
9. Indifferent Multi Injuries (Polytrauma)
10. Eclampsia
11. Encephalitis. Myelitis. Encephalomyelitis (Neuroinfections)
12. Status of Epilepsy
13. Anoxic Injury of Brain (Post resuscitation disease)
14. Brain Ischemia. (Ischemic stroke)
15. Acute Renal Failure (Uremia)
16. Diabetic Coma
17. Intracranial Injury (Grave Cranial Trauma)
18. Intracerebral Hematoma (Hemorrhagic stroke)
19. Cardiac Shock
20. Shock caused by Burn
21. Sepsis Gravis (Septic Shock)
22. Acute Respiratory Failure
23. Tetanus (Obstetrician Tetanus)
24. Endotoxic Shock
25. Acute and Sub acute Hepatic Failure (Hepatarga)
26. Undifferentiated Critical Conditions
27. Hypovolemic Shock (Hemorrhagic Shock)

Georgian Medical Standards are made by 29 blocks. It means minimum necessary treatment

1. Block – Analysis
2. Block – Main means
3. Block – Assistant means
4. Block – Correction of Hypovolemy
5. Block - Correction of Fluid and Electrolytes
6. Block – Correction of Metabolic Acidosis
7. Block - Correction of Acute Anemia
8. Block – Parenteral Nutrition
9. Block – Anticholinestherasic Treatment
10. Block – Correction of Systolic Volume
11. Block - Analgesia
12. Block – Correction of Perfusion
13. Block - Dehydratation
14. Block – Antiarrhythmic Treatment

15. Block – Anticonvulsion Treatment
16. Block – Antibacterial Treatment
17. Block - Hemodilution
18. Block – The Specific Treatment of Tetanus
19. Block - The Specific Treatment of Botulism
20. Block – Hypotensive Treatment
21. Block – Restore of Receptors Sensitivity
22. Block – Treatment of Hyperthermia
23. Block – Forced Diuresis
24. Block – Liquidation of Bronchospasm
25. Block – Nondifference Treatment
26. Block – Treatment of Acute Respiratory Failure
27. Block – Detoxication. Antioxidant Treatment
28. Block – Prevention of Tetanus
29. Block – Hemostasis

First three blocks (Analysis, Main and Assistant means) are general for all kind of critical conditions. Difference is only in quantity. The other blocks changes according by diseases. For example: Standard treatment of Status of Epilepsy consists next blocks:

- Block 01 – Analysis (Blood Analysis, ECG., X-Ray, Echoscope)
- Block 02 – Main Means (Consultation, Central Vein Catheterization, Tracheotomy Tube, Nazogastric Tube, Foley Catheter etc.)
- Block 03 – Assistant Means (Objects of Single Consumptions)
- Block 05 – Infusion of Fluid and Electrolytes (Sodium Lactate and Potassium Chlorate)
- Block 06 – Correction of Metabolic Acidosis (Sodium Bicarbonate)
- Block 08 – Parenteral Nutrition (Aminoacid, Insulin, Hypertonic Glucose)

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- Block 05 – Infusion of Fluid and Electrolytes (Sodium Lactate and Potassium Chlorate)
- Block 06 – Correction of Metabolic Acidosis (Sodium Bicarbonate)
- Block 08 – Parenteral Nutrition (Aminoacid, Insulin, Hypertonic Glucose)
- Block 13 – Dehydratation (Mannitol, Lazix)
- Block 15 – Anticonvulsion Treatment (Diazepam, Thiopental)
- Block 16 – Antibacterial Treatment (Cefotaxime , Ciprofloxacin)
- Block 25 – Non Difference Treatment (Atropine, ketamine, Adrenalin)
- Block 26 – Correction of Acute Respiratory Failure (Diazepam, Oxigen, Atracurium Besylate)

The treatment standards must not be acknowledged as a dogma and must not be demanded as a necessary condition. Standards must be admitted as the program for action and a physician must have the right to maneuver by himself in each concrete situation within the standard limits. Hereby, it is obligatory as well that standards should be easy and they must not create additional problems in a medical staff work. It is also important that standards must be real and they must be calculated not for countries central but for peripheral clinic possibility and ability and a clinic should base its work upon these standards in practical life. Hereby, standards creating initial provision must guarantee minimum necessary treatment. But besides the basic so-called state standards, there must be additional so-called clinic internal standards and owing to them a patient and his people can finance a patient's additional treatment on higher than minimum treatment level. This refers to the following diagnostical and treatment methods angiography, dopplerography, computer tomography, magnetic nuclear resonance, immunological investigation, plasmapheresis, immunosorbtion, haemodialisis, surgical operations and other methods whose application is vitally important for patients along vital requirements of state standards.

The additional blocs in our clinic includes: computer tomography, nucleic magnetic resonance, angiography, laparoscopy, bronchoscopy, electroencephalography, gastrofibroscopy, systolic volume monitoring, coagulogic, immunologic toxicologic, bacteriologic, virusologic and other complex examinations. . Also including internal standard of alimentary and aftercare monitoring. As to critical conditions liquidation by operating treatment, in this case are used state or basic standards that are in surgery and anesthesiology. There are not essential distinctions between state standards in the age aspect.

It is interesting to know that decrease of the treatment costs for these patients were given on the expenses of different examinations which were given if absolutely necessary. Also it was important to cut cost on the expanses of antibacterial treatment – this treatment was given when infection process appeared and not for prophylactic purposes. Expansive antibiotics were substituted by the combination of cheap antibiotics that would covering microbus flora in the clinic. This is usually combination of 3 or 4 antibiotics. Often is given combinations from ciprofloksacin group, aminoglikozids, vankomycin, ftorchinolin, sulbaktam and others based on the knowledge of bacterial map. Instead of parenteral feeding enteral feeding was mainly given with nazo-gastrical tube. Parenteral feeding was given on the expenses carbon hydrate of n with calorimeter by all means 3500k per day. Antioxidant therapy was given on the expanses of oxithril, and not by such expansive antioxidant as reamberin and others. Using of plasma and albunimis was restricted, and only red blood cells was used from blood components. First hand materials were used longer than usual and were used for a week instead of just on day. For example: if nazo-gastrical tube, subclavicular catheter, bladder catheter were usually changed every day, or every other day, now there were changed only once a week. The treatment results were not different.

Considering all of the above mentioned we were able to calculate differences between the treatments at the critical medicine service with restricted resources and nonrestrictive resources. We have following results: with restricted resources the treatment cost of one bed day is 218 $, while with non restricted resources the cost of one bed day in Georgia is 360-427 $, the difference is 141-209 $. Totally if the treatment in

our case costs 1 030 511 $, it is 1 693 416- 2 013 245 $ with non restricted resources. The difference is 662 905- 982 737 $ which is a considerable amount. Also it is considerable that the lethality in the patients of both groups is 35%, and the length of patient's staying at the clinic is 4,5-4,6 days in both cases.

კრიტიკულ მდგომარეობათა მედიცინა შეზღუდული რესურსების დროს

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რეზიუმე:

კრიტიკული ავადმყოფების მკურნალობის თანხების შემცირება ხდებოდა: გამოკვლევების ხარჯზე – ისინი ავადმყოფს უტარდებოდა იმ შემთხვევაში, როცა ამის აბსოლიტური ჩვენება იყო. ასევე მნიშვნელოვანი იყო ხარჯების შემცირება ანტიბაქტერიული მკურნალობის ხარჯზე – მისი გამოყენება იწყებოდა ინფექციური პროცესის გამოვლენისას და არა პროფილაქტიკის მიზნით, ძვირადღირებული ანტიბიოტიკების ნაცვლად გამოიყენებოდა შედარებით იაფი ანტიბიოტიკების იმგვარი კომბინაცია, რომელიც გადაფარავდა კლინიკაში არსებულ მიკრობულ ფლორასეს უხშირესად იყო 3 ან 4 ანტიბიოტიკის კომბინაცია და ისიც ზონდით მიცემული.ენტერალური კვება იწყებოდა პირველი შესაძლებლობისთანავე.პარენტერალური კვება კი ძირითადად ნახშირწყლებით ხდებოდა. შეზღუდული იქნა პლაზმის გამოყენება, ასევე ალბუმინისაც და სისხლის კომპონენტებიდან ძირითადად გამოიყენებოდა ერითროციტული მასა. პირვალადი მოხმარების საგნებიდან შეზღუდვა ხდებოდა იმის ხარჯზე, რომ მათი გამოყენების დრო, ნაცვლად ერთი დღისა, 1 კვირამდე გავახანგრძლივეთ. მაგ: ზონდი, ლავიწქვეშა ვენის კათეტერი, შარდის ბუშტის კათეტერი ადრე თუ იცვლებოდა ყოველდღე ან ყოველ მეორე დღეს, ამ შემთხვევაში მათი გამოცვლა ხდებოდა 1 კვირის შემდეგ და ამით მკურნალობის შედეგები არ შეცვლილა. ყოველივე ზემოხსენებულის გათვალისწინებით გამოითვალა ის განსხვავება, რაც კრიტიკული მედიცინის სამსახურის შეზღუდული და შეუზღუდავი რესურსების პირობებში ჩატარებული მკურალობის დროსაა

შეზღუდული რესურსების დროს მკურნალობის ერთი საწოლდღე ჯდებოდა 218$,შეუზღუდავი რესურსების პირობებში მკურნალობის ერთი საწოლ-დღე 427 $ მოიცავდა სხვაობა მათ შორის 209 $, ხოლო ერთი წლის მკურნალობის საფასურის სხვაობა შეუძღუდავი რესურსებისას -982 737 $-ით ნაკლებია ამასთან ლეტალობა ორივე ჯგუფის ავადმყოფებში 35% იყო, ხოლო ავადმყოფთა კლინიკაში დაყოვნების მაჩვენებელი ორივე შემთხვევაში 4,5-4,6 დღემდე მერყეობდა.

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