Progenitor precursors' committing at critical stroke

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According to the Critical Care Medicine Institute were 659 critical patient with stroke that equal 27.7% of total and among them 49,1% had ischemic and 50,9% hemorrhagic stroke. Stroke's common lethality was 49.3.%,but frequency of lethality according to the stroke's type at ischemic stroke was equal to 26.5% and at hemorrhagic stroke showed 71.3%.Treatment State standard included respiratory therapy realized as moderate hyper-ventilation pattern. Acid-base balance markers were supervised and strictly corrected. In most cases adrenoreactive intravenous medications infusion should be used, as well as water exchange, electrolyte supporting, antiedematous glycerin about 1mg/kg/24hr, antibacterial therapy since treatment problems often appeared as bilateral bronchopneumonia, parenteral and enteral feeding (about 28 - 45 Kcal/Kg /per 24 hr) and etc. Patients have been treated with Progenitor Precursor Committing Superintendence therapy from early hours after hospitalization procedure was managed by guidance of treatment paten (Zv.Kheladze at all. „New usage of electro impulses generator". 2008.07.01 #4857, ". Zv.Khelade at all. ,,New usage of Plasma flow producer 2008.06.26 #4825, Z.Kheladze, Zv.Kheladze ,,New usage of Nitroglycerin". 2008.07.11 # P4858). Therapy implied of processing on bone marrow with: electro impulses, plasma flow under infusion of nitroglycerin. In process of treatment by Progenitor precursor committing therapy lethality coefficient decreased about for 8.3%, better results have been taken in treatment of ischemic stroke 17.5%. In that way superintendence strategy of Progenitor precursors committing can give a lift in process that actually response in reparation of damaged brain parts.

Key words: stroke treatment, progenitor precursor committing, critical patient.

Actuality.

More than 15 million people in the world are ill with different cerebral pathologies and 5-6 million of them (30-40%) have stroke. Every year about 795 000 cases occur 180 000 of which are re-insults and after each 40 seconds a new case of insults happen (National Stroke Association's Acute Stroke Resource Center, 2009). In 2006, number of patients with nerve system disease reached 31 900 in Georgia (http://www.Statistics.ge). According to the data of Z. Kheladze (1998) patients with nervous pathologies hospitalized in the critical care medicine clinics are on the 2nd - 3rd places by rate. Most of them had stroke. Stroke occurs more frequent in young men and in women of elder age. Relativity between men and women is 11 to 9. In 1993-1999 frequency of hospitalized patients with stroke constituted 158 per 100 000 citizens 87,0% of which had ischemic insult, 10% hemorrhagic and only 3% was presented as subarachnoid hemorrhage stroke. According to the WHO the stroke is at the first cause of lethality and three times exceeds mortality at myocardial infarction (STONE, Syst-Eur, NICS 2008). In the USA 54% of patients with stroke die without hospitalization and in general 59% die of stroke. It must be mentioned that during first 30 days 8%-12% of patients aged 45-64 die of ischemic and 37%-38% of hemorrhagic strokes. 8.1% of patients elder than 65 die of ischemic and 44,6% of them after hemorrhagic strokes. In 1994-2004 death rate caused by insults decreased by 24,2%. It is important that age of men who died of strokes is younger, than of women. Essentially, average age of mortality caused by stroke is 79,6. The result shows insults death indicator decrease by 2.5% - 2,9% per year. This indicator was considered to be one of the ten greatest achievements in the XX century medicine. The rate of death caused by ischemic stroke is about 30%-40% and up to 80% at hemorrhagic stroke. It should be mentioned that death rate sharply vary in different countries. For example in Switzerland death rate caused by stroke is lower by 19% than in the USA. Also lethality in

West Europe is decreased compared to last centuries; in East Europe it was increased (National Stroke Association's Acute Stroke Resource Center, 2009).After first stroke the average duration of life in the age of 60-69 is 6,8% in men and 7,4% in women, and within 70-79 years it is 5,4% in men and 6,4% in women; in persons elder than 80 year - 1,8% in men and 3.1% in women. 50%-79% of survivors are invalids: 15%-30% of them can live independently, 30% are deep invalids and 20% of them need permanent care. According to the data of the WHO direct and indirect cost of treating single patient with stroke may reach USD 55 000 - 73 000. In the USA, in 2008 USD 65.5 millions was spent during a year and USD 60 363 expended on each patient. Including rehabilitation, approximately USD 140 000 is spent per patient. In the acute stroke period, main components of spending are costs paid for hospital ward and service (40%), medicines (21%) and diagnostic (19%).Population and life duration expansion will increase the number of patients with strokes and mortality. According to the prognosis of the US Census Bureau for 2050 year number of patients died with stroke shall be three times more that it is today. One of the reasons for this probably is an increase of average life duration. Annual risk of developing strokes in various age groups is as follows – 0,1% in the age of 45-50, 1% in the age of 65-74, 5% in the age elder than 80, that is to say this is the fate of each fourth person. By Framingem examination the risk of developing strokes in persons, aged more than 55 is being doubled every decade. According to other examination death probability increases by 11% starting from 69 years and is doubled in each 6.6 years
(http://www.biomedcentral.com/1471-2377/8/12).
From upper mentioned cases of stroke at critical care medicine clinics are increasing, index of invalidity and mortality have hi points as well. The motivation of finding and researching of new treatment methods are demanded more than ever. From that point of view using of Progenitor precursor committing superintendence can give rise of treatment effectives by managing reparation processes in human brain furthermore this thoughts have been proved by researches that have been made in past in The Critical Care Medicine Institute.

Materials and Methods

According to the Critical Care Medicine Institute data in 2000-2008 years there were 659 critical patient with stroke that equal 27.7% of total and among them 49,1% had ischemic and 50,9% hemorrhagic stroke. Stroke's common lethality was 49.3.%, but frequency of lethality according to the stroke's type at ischemic stroke was equal to 26.5% and at hemorrhagic stroke showed 71.3%. Expended patient-days constituted 30% of total (table 1.). Patients were divided in two groups:. in first control group we include critical patients treated according to the classic standard [1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 15, 16, 17, 18, 19, 23, 24, 25, 28, 29.] and in second group we collect patients underwent the State standard and progenitor precursors' committing therapy comprise bone marrow electrical stimulation, plasma radiation flow and intravenous nitroglycerin infusion.

Table 1 Stroke frequency

Indicators	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Stroke frequency	8%	9%	11%	19%	22%	20%	23%	41%	38%	42.2%
Hemorrhagic stroke	75%	58%	65%	48%	56%	49%	51%	49%	49%	51.4%
Ischemic stroke	25%	42%	35%	52%	44%	51%	49%	51%	51%	48.6%
Women	37%	28%	35%	39%	28%	37%	39%	46%	43%	42.1%
Men	63%	72%	65%	61%	72%	63%	61%	54%	57%	57.9%
Bed-day	29	12	38	129	140	145	81	510	672	927

Hospitalized patients with stroke have been placed in to main group, the treatment were processed with guidance of traditional treatment (Z.Kheladze 2007 year) that sensed to manage: Treatment State standard included respiratory therapy realized as moderate hyper-ventilation pattern. Acid-base balance markers were supervised and strictly corrected. In most cases adrenoreactive intravenous medications infusion should be used, as well as water exchange, electrolyte supporting, antiedematous glycerin about 1mg/kg/24hr, antibacterial therapy since treatment problems often appeared as bilateral bronchopneumonia, parenteral and enteral feeding (about 28 - 45 Kcal/Kg /per 24 hr) and etc. Patients have been treated with Progenitor Precursor Committing Superintendence therapy from early hours after hospitalization procedure was managed by guidance of treatment patent (Zv.Khelade at all.,,New usage of electro impulses generator". 2008.07.01 #4857, Zv.Kheladze at all ,,New usage of Plasma flow producer" 2008.06.26 #4825, Z.Kheladze, Zv.Kheladze ,,Usage of Nitroglycerin". 2008.07.11 # P4858). Therapy implied of processing on bone marrow with: electro impulses, plasma flow under infusion of nitroglycerin. (Table 2)

Table 2 All Stroke incidence and mortality in Critical Care Medicine

Authors	Year	Total number of patient with stroke	Mors	Mortality %
Critical Care Medicine Institute	2000	8	5	62%
	2001	7	3	42.8%
	2002	14	9	64.2%
	2003	23	10	43.4%
	2004	25	13	52%
	2005	27	14	51%
	2006	61	29	47.5%
	2007	123	60	48.7%
	2008	163	75	46%
	2009	208	107	51.4%
	Total	659	325	49.3%

Controlled group was gained from information that had been published by authority medical researchers, information contained results of treatment of Critical Care stroke. Patients in controlled group had been treated by guidance of standard treatment Progenitor precursor committing therapy was not used. (Table 3)

Table 3 Stroke incidence and mortality of the various Authors

#	Authors	Total number of patient with stroke	Mors	Mortality %
1	Delashaw et all 1990 (#5)	13	9	69.2%
2	Steiger et all 1991 (#6)	15	10	66.6%
3	Wirtz et all 2002(#7)	118	68	57.6%
4	Holtkamp et all 2001(#8)	24	12	50%
5	Mori et all 2001 (#9)	34	11	32.3%
6	Mori et all 2004 (#10)	15	7	46.6%
7	Kuroki et all 2001 (#11)	52	20	38.4%
8	Cho et all 2003 (#12)	24	6	25%
9	Maramattom et all 2004 (#13)	24	10	41.6%
10	Yang et all 2005 (#14)	36	11	30.5%
11	Georgiadis et all 2002 (#15)	15	3	20%
12	Els et all 2006 (#16)	25	11	44%
13	Schwab et all 1998 (#17)	50	19	38%
14	Georgiadis et all 2001 (#18)	6	1	16.6%
15	Milhaud et all 2005 (#19)	10	5	50%
16	R Soissi, W Trabelski, Z Habad, and L Shandrani 2007 (#20)	24	16	66.6%
17	CHU Fann. Dakar. 2006 (#21)	51	41	80.4%
18	Fan Shawe M, Venkates B, Boots R. 1994-1999 (#22)	35	19	54%
19	NBER WORKING PAPER SERIES MEDICAL CARE AT THE END OF LIFE ... by AM Garber 1998(#23)	No information	-	70%
20	Author: Denise Nassisi, MD, Assistant Professor, Department of Emergency Medicine, Mount Sinai Medical Center. 2009 (#24)	No information	-	80%
	Total	571	326	57.1%

According to ischemic and hemorrhagic stroke, first and second grope have been divided in to tow sub-groups, where is proclamation about patients number and lethality. (Table 4,5,6,7)

Table 4 Ischemic Stroke incidence and mortality in Critical Care Medicine

Authors	Year	Number of patient with ischemic stroke	Mors	Mortality %
Critical Care Medicine Institute	2000	2	0	0%
	2001	3	0	2%
	2002	15	3	60%
	2003	12	1	8%
	2004	11	1	9%
	2005	14	3	21%
	2006	30	10	33.3%
	2007	63	11	17.4%
	2008	83	26	31.3%
	2009	101	31	30.6%
	Total	324	325	26.5%

Table 5 Hemorrhagic Stroke incidence and mortality in Critical Care Medicine.

Authors	Year	Number of patient with hemorrhagic stroke	Mors	Mortality %
Critical Care Medicine Institute	2000	6	5	83.3%
	2001	4	3	75%
	2002	19	6	66.6%
	2003	11	9	81.8%
	2004	14	12	85.7%
	2005	13	11	84.6%
	2006	31	19	61.2%
	2007	60	49	81.6%
	2008	80	49	61.2%
	2009	107	76	71%
	Total	335	239	71.3%

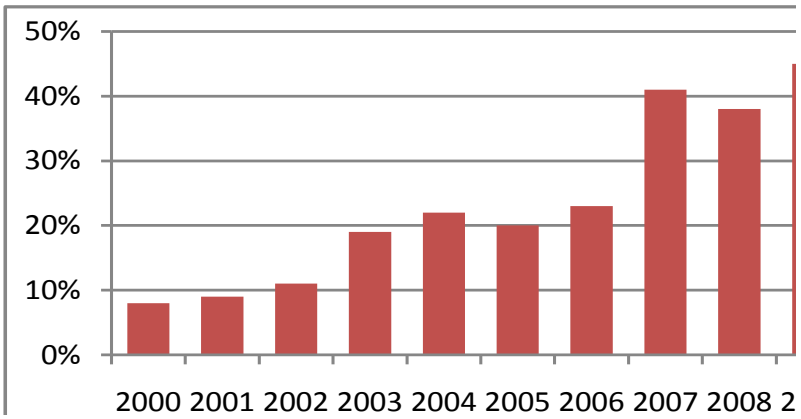
Table 6 Ischemic stroke incidence and mortality of the various Authors.

#	Authors	Year	Number of patient with ischemic stroke	Mors	Mortality %
1	Delashaw et all 1990 (#5)	1990	13	9	69.2%
2	Steiger et all 1991 (#6)	1991	15	10	66.6%
3	Wirtz et all 2002(#7)	1997	118	68	57.6%
4	Holtkamp et all 2001(#8)	2001	24	12	50%
5	Mori et all 2001 (#9)	2002	34	11	32.3%
6	Mori et all 2004 (#10)	2001	15	7	46.6%
7	Kuroki et all 2001 (#11)	2003	52	20	38.4%
8	Cho et all 2003 (#12)	2004	24	6	25%
9	Maramattom et all 2004 (#13)	2005	24	10	41.6%
10	Yang et all 2005 (#14)	2002	36	11	30.5%
11	Georgiadis et all 2002 (#15)	2006	15	3	20%
12	Els et all 2006 (#16)	1998	25	11	44%
13	Schwab et all 1998 (#17)	2001	50	19	38%
14	Georgiadis et all 2001 (#18)	2001	6	1	16.6%
15	Milhaud et all 2005 (#19)	2005	10	5	50%
	Total		461	203	44%

Results and discussion

By analyzing yearly annuals of Critical Care Medicine Institute the number of critical stroke patients is abruptly incising, if in 2000 year the percentage was 8.0% and in 2009 year 45.0% this is 26 time increased number (Fig.1). Especially augmentation was mentioned during 2007 and 2009 years.

Fig.1.



Correlation between ischemic and hemorrhagic stroke almost is the same, ischemic stroke 49.0%, hemorrhagic 51.0%. According to statistic correlation between ischemic and hemorrhagic strokes have little changes and sharp differences have not been dedicated. (Fig.2)

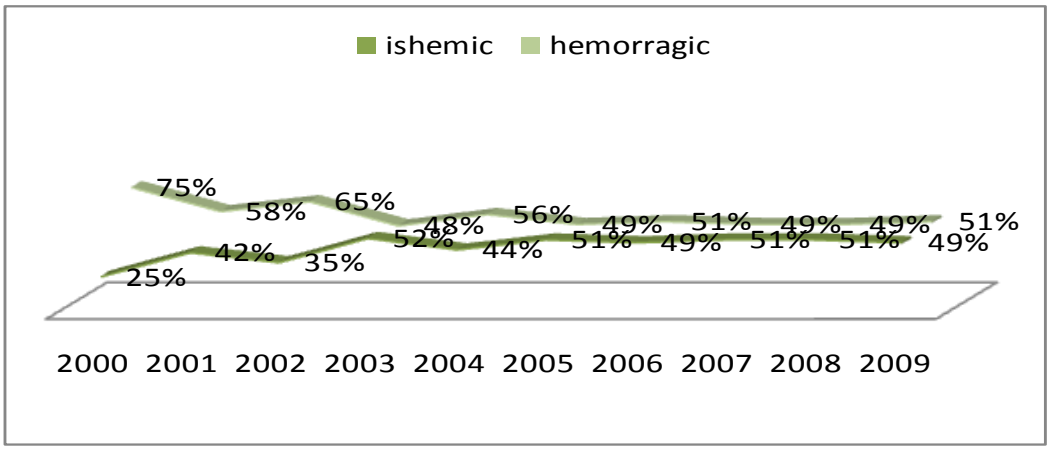
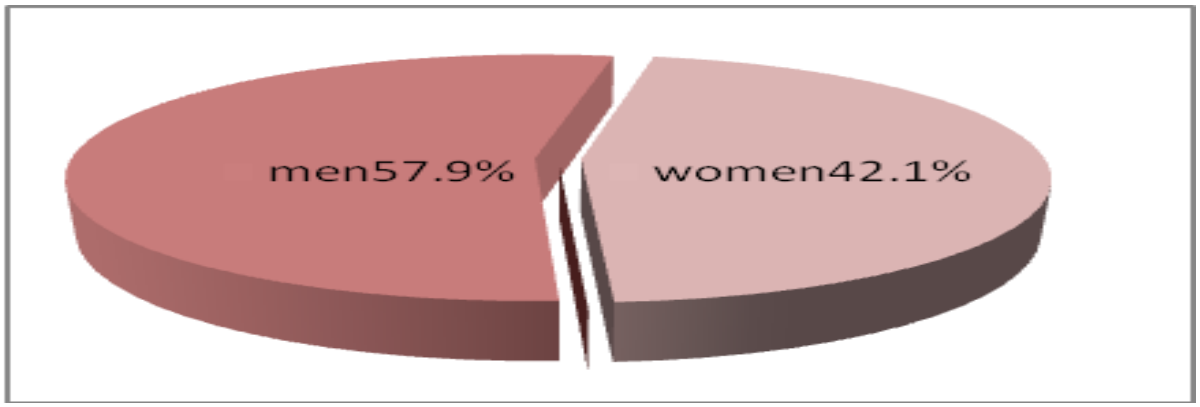


Fig. 2

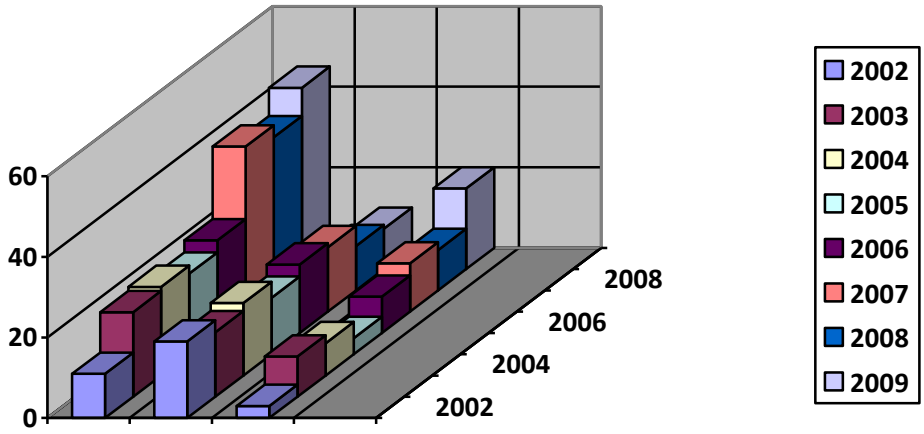
Subject of interest is the fact that stroke appears more seldom in women – 42,1% than in men – 57,9%. (Fig. 3)

Fig.3



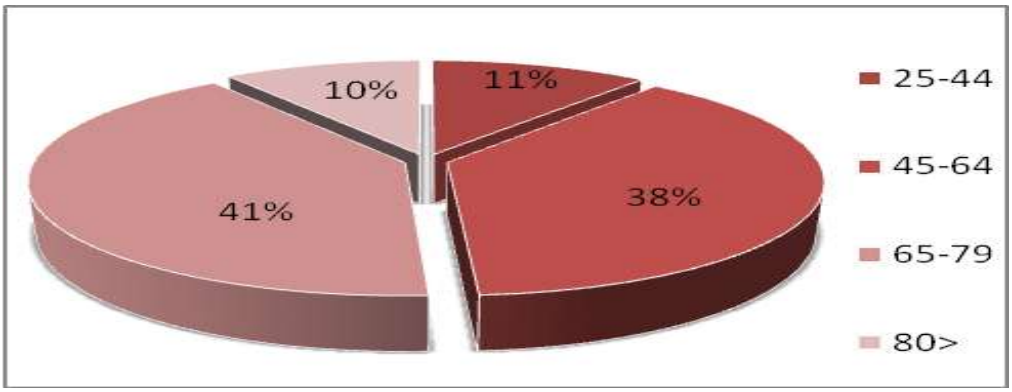
According to the data of The Critical Care Medicine Institute in 2000-2002 the stroke was on the second place behind polytrauma. After 2003-2005 the stroke headed the list and polytrauma moved on the second place, then it come brain trauma and next acute respiratory insufficiency. (Fig.4)

Fig.4



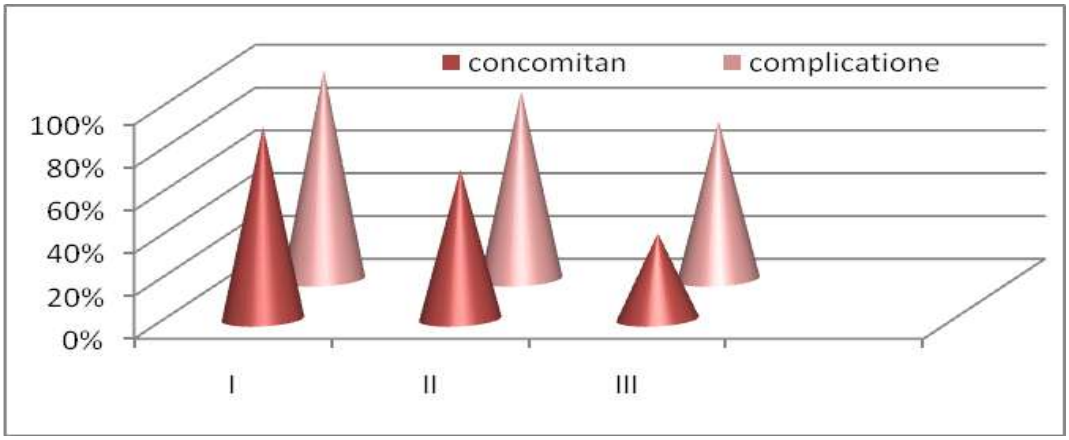
20 years ago it was considered that stroke was an "aged people's disease" ,but recently the stroke became younger. The stroke appears even in 30 years old persons. According to own data its frequency at the age of 25-44 years is 11%, at 45-64 - 38%, at 65-79 - 41% and after 80 it drops around 10%. Hence to this, most facts of stroke appears in able-bodied age (Fig.5.).

Fig 5



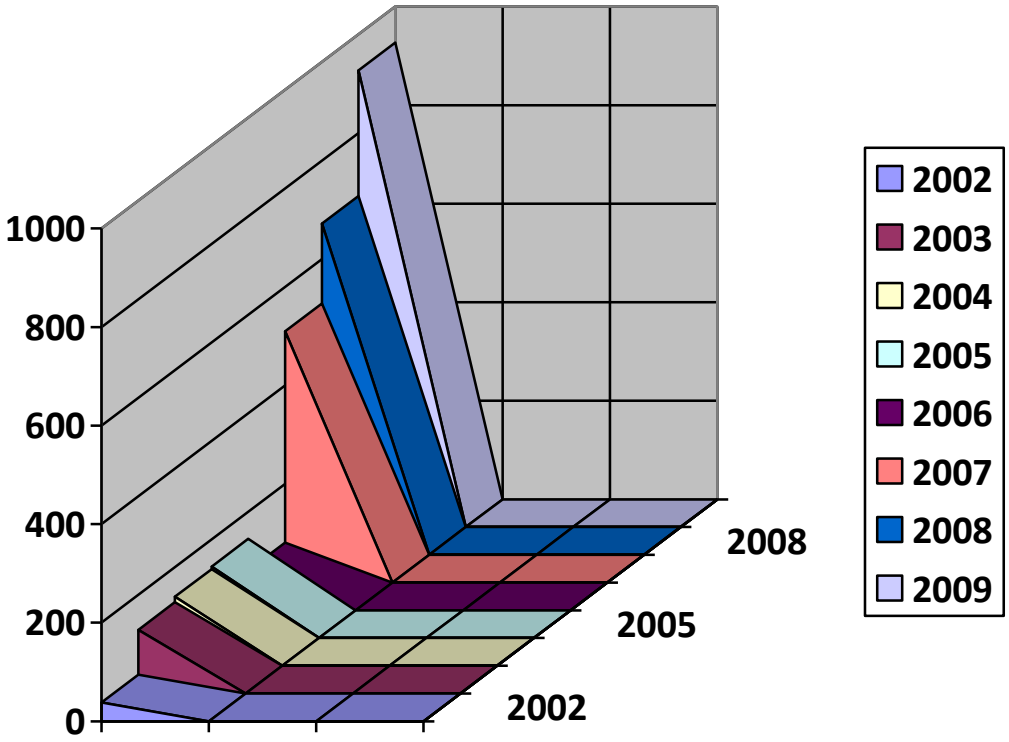
75-90% of patients had concomitant arterial hypertension, heart coronary disease and generalized heavy atherosclerosis; at the same time 40% of patients had diabetes mellitus and as a complication 74% of patients had brain edema, 87% - bilateral bronchopneumonia and tracheobronchitis and 56% - an aspiration syndrome (Fig. 6.).

Fig. 6.



In main group where treatment included using of progenitor precursor committing therapy by side of standard treatment, total lethality number constituted 49.0%, in separate: ischemic stroke constituted 26.5%, hemorrhagic stroke 71.3%. In controlled group total lethality constituted 57.1%, in separate: ischemic stroke 44.0%, hemorrhagic stroke 70.2%. In The Georgian Critical Care Medicine Institute's Clinic total lethality number during critical stroke were lower approximately to controlled group data: total lethality 7.8%, observing of ischemic stroke data difference were shown by 17.5%, during hemorrhagic stroke lethality number were ameliorated up to 1.1%. Bed day incising were in dynamic aspect by side incising of patients number and constituted relative changes from 200 year and further: in 2003 incised 4 times, 2005 five times, 2007 seventeen times, 2008 twenty-three times and 2009 year twenty-six times, (Fig.7). Detaining of one patient constituted 4.7 day.

Fig.7

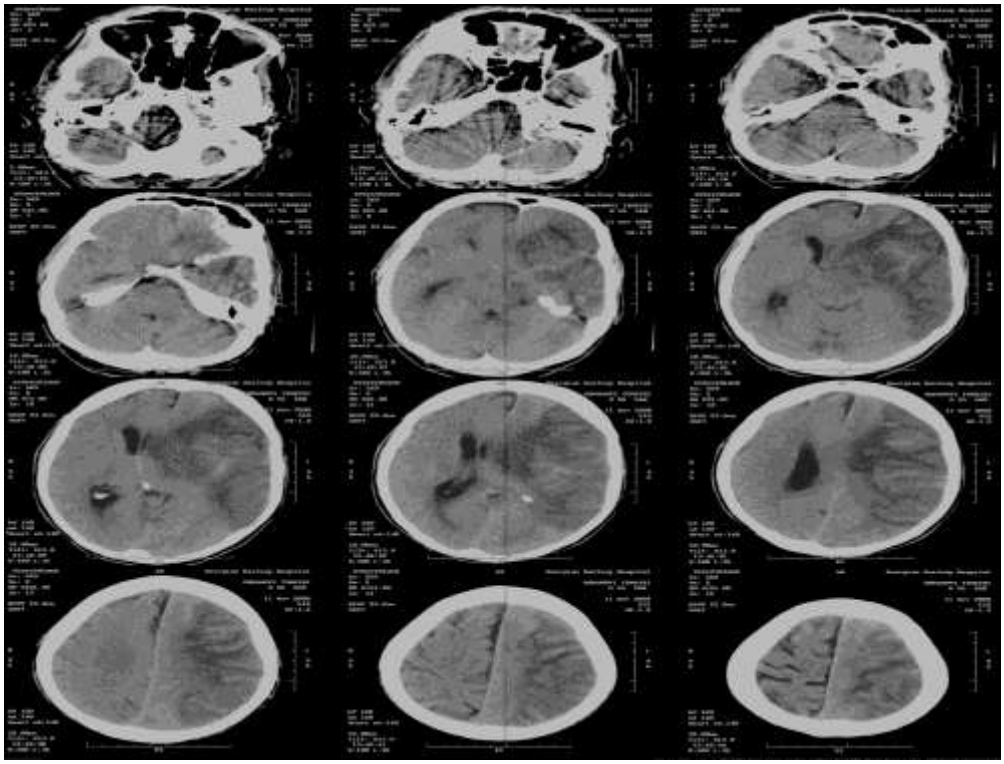


Stroke is not problem of only one field it has social reflection. As it was mentioned upper critical stroke has hi lethality index and in our clinic data shows that it is 48.0%. From saved patients nearly 80.0% need on bed care after discharging from the hospital. Only 20.0% patients can take care of them self. Treatment and rehabilitation of patients have hi costs and is long lasting as well as the medicaments that are used are dedicated to be very expensive. Merely our clinic findings show that daily direct and indirect expenses are over 400$. One patient treatment mean cost in The Georgian Critical Care Medicine Institute have reached up to 1628$.

We demonstrate two cases of the stroke: both were middle aged men, first patient had an ischemic stroke and second patient a hemorrhagic insult.

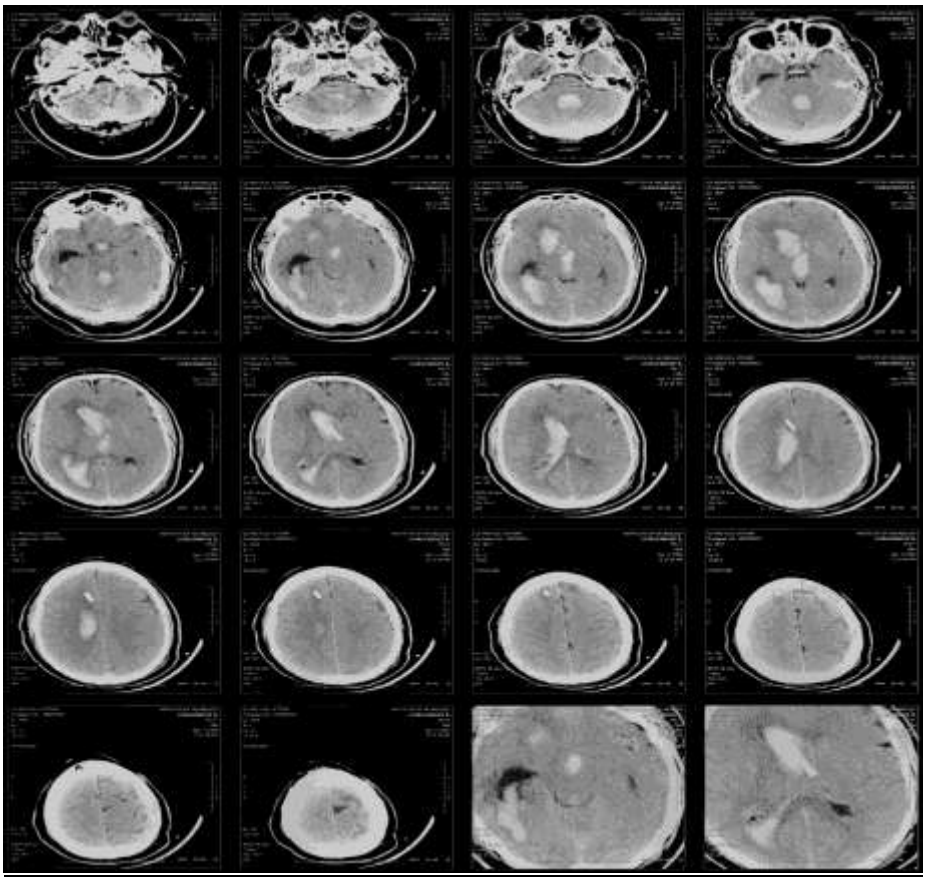
1. Patient – 61 years old, male. Diagnose – stroke, acute stage, ischemic insult in the area of the left middle artery basin, brain edema, afteraspiration suppurative tracheobronchitis and bilateral bronchopneumonia complicated by acute sepsis and polyorganic failure. By CT search:wide ishemic area at forehead and temple segments,atrophic hydrocephaly, middle structures shift about 16 mm. (Fig.10.). The patient arrived on 25.09.07 and was descharged on 23.10.07. From the very first day of hospitalization he underwent respiratory therapy in moderate hyper-ventilation pattern, antiedematous and antibacterial treatment, water exchange and polyelectrolyte supporting, magnesia therapy, medicative narcosis, parenteral and enteral feeding about 28 - 45 Kcal/Kg /per 24 hr etc.; after a week tracheotomy was done. Patients were treated with Progenitor precursor committing therapy from the first hours after hospitalization till discharging from the hospital by guidance of committing manual. On 16.01.09 lung ventilation was suspended, on 21.10.09 extubation was done and on 23.10.09 patient was dishcarged from The Critical Care Medicine Institute in steady state: he properly contacted, was adequate and needed aftercare. Intrahospital treatment lasted 28 days and had costs USD 11 2002.

Fig.8.



2. Patient, 60 years old, male. Diagnose – stroke, acute stage, hemorrhagic insult, intra-cerebral hematoma in the temple area, parenchimal and intraventricular hemorrhage, brain edema, tracheobronchitis, bilateral pneumonia, acute respiratory insufficiency. By CT search: intra cerebral hematoma in the temple area, parenchimal and intraventricular hemorrhage, middle structures' shift about 12mm, brain edema (Fig.11.). Patient arrived on 11.09.08 and was discharged on 03.10.08. He underwent respiratory therapy in moderate hyper-ventilation pattern, antiedematous and antibacterial treatment, water exchange and polyelectrolyte supporting, magnesia therapy, medicative narcosis, parenteral and enteral feeding about 28 - 45 Kcal/Kg /per 24 hr etc.. Patients were treated with Progenitor precursor committing therapy from the first hours after hospitalization till discharging from the hospital by guidance of committing manual. On 22.09.2008 lung ventilation was suspended, on 29.09.2008 extubation was done and on 03.10.2008 patient was dishcarged from The Critical Care Medicine Institute in stable severe state: he incompletely contacted, was partially adequate, aphasia was still remaining, had cerebral coma 11 point by Glasgow scale and needed aftercare. Intrahospital treatment lasted 23 days and had costs USD 9 300.

Fig.9.



Conclusion:

Rate of stroke that is associated with critical condition raise, hemorrhagic and ischemic strokes develop side by side. Accompanying complication frequently represented as: hypertonic disease and hart dysfunctions. Lethality is 49.3% mainly by cause of hemorrhagic stroke, the mortality was about 49.3%, and it was happened basically do to hemorrhage stroke, witch suspense ischemic stroke in

26,8%. Origin of stroke have raised in able-bodied population, middle bed day for every patient constituted 4.7, treatment costs have gained to 20035$ despite of limited sources. After liquidation of critical condition invalidity have hi frequency in patients. Independent life can proceed 20.0%, deep invalidity outcome comes in76.0%, vegetative condition 4.0%. In process of treatment by Progenitor precursor committing therapy lethality coefficient decreased about for 8.3%, better results have been taken in treatment of ischemic stroke 17.5%. In that way superintendence strategy of Progenitor precursors committing can give a lift in process that actually response in reparation of damaged brain parts.

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პროგენიტული პრეკურსორების კომიტირება კრიტიკული ინსულტების დროს

ზ. ხელაძე, ე.ქარცივაძე, ზვ. ხელაძე
საქართველოს კრიტიკული მედიცინის ინსტიტუტი

საქართველოს კრიტიკული მედიცინის ინსტიტუტში მკურნალობა ჩატარებული აქვს ინსულტით დაავადებულ 659 ავადმყოფს, მათ შორის იშემიური ინსულტით იყო 49,1%, ხოლო ჰემორაგიულით 50,9%. კომის ხარისხი ყველა ავადმყოფში GCS-8 და ნაკლები იყო. საერთო სიკვდილობამ 49,3% შეადგინა. ლეტალობა იშემიური ინსულტით 26,5%, ჰემორაგიული ინსულტისას კი 71,3% იყო. ინსულტით მკურნალობის სტანდარტი მოიცავდა რესპირატორულ თერაპიას (SIMV,PS & PC Modes) ზომიერი ჰიპერვენტილაციის თანხლებითა და მჟავა-ტუტოვანი ბალანსის კონტროლით, მაგნეზიურ და პოლიელექტროლიტურ თერაპიას, ენტერალურ კვებას 400 კალ/კგ/24სთ, თავის ტვინის შეშუპების პრევენციას გლიცერინით (ენტერალური დოზა 1 მგ/ კგ/ 24სთ), ანტიბაქტერიულ პრეპარატებს. ტრადიციული თერაპიის დამატებით ინსულტის მწვავე პერიოდში ტარდებოდა პროგენიტური პრეკურსორების კომიტირების მართვა ნიტროგლიცერინით, ელექტროდენით და პლაზმური სხივებით (ზვ.ხელაძე და თანაავტ., პატენტი №4857; ზვ.ხელაძე და თანაავტ., პატენტი №4825; ზვ.ხელაძე და ზ.ხელაძე პატენტი №P4858}. კვლევის პროცესში დადგინდა, რომ პროგენიტური პრეკურსორების კომიტირების მართვა აუმჯობესებს ინსულტით,განსაკუთრებით კი იშემიური ინსულტით გამოწვეული კრიტიკული მდგომარეობის მკურნალობის შედეგებს. სახელდობრ: ამცირებს ლეტალობის და ინვალიდობის მაჩვენებლებს. ასევე მოკლდება მკურნალობის ხანგრძლივობა და იაფდება მისი ღირებულება.