Analysis of factors that effect on critical stroke outcome.

E.Kartsivadze, Z.Kheladze, N.Ninua, Zv.Kheladze, N.Kajaia.

Georgian Critical Care Medicine Institute.Tbilisi.

In the Georgian Critical Care Medicine Institute 1010 (100%) patients with stroke were studied. 54.3% was ischemic stroke and 45.7% hemorrhagic. Degree of coma in every patient was GCS-8 and less. Mortality was 49.5% for ischemic stroke and for hemorrhagic stroke 68.3%. Number of bad-days 3867 and average length of one patient delay was 3.8 bad-days. Standards of patient treatment included respiratory (SIMV, PS & PC Modes) accompanied by moderate hyperventilation and controlling acid-base balance, magnesium and polyelectrolyte therapy, enteral feeding 400Kcal/kg/24h, glycerin for the prevention of brain edema (enteral dose 1mg/kg/24h) and antibacterial drugs. During acute period of stroke, in addition to traditional therapy, management of progenitor precursors commiting were carried out with nitroglycerin, electric power and plasma rays (Z. Kheladze and co-author, patent №10786/01; Z. Kheladze and co-author, patent №10792/01; Z. Kheladze and co-author, patent №10810/01). During research it was found out, that there are some demographic and topographic varieties according to the stroke forms and sides. Defining preliminary prognoses of stroke are some ways to reduce costs.

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 700 000 cases occur 200 000 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). Stroke occurs more frequently 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.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 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.

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 million 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 (2009y) 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.

From upper mentioned cases the critical conditions of stroke at critical care medicine clinics are increasing, index of disability and mortality has high 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 the rise of treatment effectiveness 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 2000-2011 years there were 1010 critical patient with stroke that equal 25.5% of totaland among them 54.3% had ischemic and 45.7% hemorrhagic stroke. Stroke's common lethality was 49.5%, but frequency of lethality according to the stroke's type at ischemic stroke was equal to 31, 9% and at hemorrhagic stroke showed 68.3%. Expended patient-days constituted 3867. (Table 1)

Table.1 Stroke frequency

Indicators	2000 %	2001y %	2002y %	2003y %	2004y %	2005y %	2006y %	2007y %	2008y %	2009y %	2010y %	2011y %	x±m%
Insult frequency	8	9	11	19	22	20	23	41	38	45	37	33	25,5 ±1.2
Hemorrhagic insult	75	58	65	48	56	49	51	49	49	51	56	28	53.9 ±1.1
Ischemic insult	25	42	35	52	44	51	49	51	51	49	49	72	46.1 ±1.1
Women	37	28	35	39	28	37	39	46	43	45	45	57	40.1 ±0.8
Men	63	72	65	61	72	63	61	54	57	55	55	43	59.9 ±0.9
Mortality	62	42	64	43	52	51	42	48	46	51.4	57.9	40.4	49.2 ±0.7
Bed-day	29	12	38	129	140	145	81	510	672	927	531	653	321.2 ±20.8

Hospitalized patients with stroke have been placed in two main groups, 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 0,35-0,4 Kcal/Kg/24hr) 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.Kheladze and others identification #10786/01,Zv. Kheladze and others identification #10792/01, Zv.Kheladze and others identification #10810/01). 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%
	2010	188	109	57,9%
	2011	163	66	40.4%
		1010	500	49.5%

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 other Authors

#	Authors	Total number of patient with stroke	Mors	Mortality %
1	Delashaw et all 1990 (118)	13	9	69.2%
2	Steiger et all 1991 (119)	15	10	66.6%
3	Wirtz et all 2002(104)	118	68	57.6%
4	Holtkamp et all 2001(114)	24	12	50%
5	Mori et all 2001 (120)	34	11	32.3%
6	Mori et all 2004 (111)	15	7	46.6%
7	Kuroki et all 2001 (121)	52	20	38.4%
8	Cho et all 2003 (115)	24	6	25%
9	Maramattom et all 2004 (116)	24	10	41.6%
10	Yang et all 2005 (122)	36	11	30.5%
11	Georgiadis et all 2002 (124)	15	3	20%
12	Els et all 2006 (125)	25	11	44%
13	Schwab et all 1998 (95)	50	19	38%
14	Georgiadis et all 2001 (99)	6	1	16.6%
15	Milhaud et all 2005 (94)	10	5	50%

16	R Soissi, W Trabelski, ZHabad, and L Shandrani2007	24	16	66.6%
17	CHU Fann. Dakar. 2006	51	41	80.4%
18	Fan Shawe M, Venkates B, Boots R. 1994-1999	35	19	54%
19	NBER WORKING PAPER SERIES MEDICAL CARE AT THE END OF LIFE ... by AM Garber 1998	No information	-	70%
20	Author: Denise Nassisi, MD, Assistant Professor, Department of Emergency Medicine, Mount Sinai Medical Center. 2009	No information	-	80%
	Total	571	326	57.1%

According to ischemic and hemorrhagic stroke, first and second groupe have been divided into two 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	0%
	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%
	2010	106	45	42.4%
	2011	118	44	37.2%
	Total	548	175	31.9%

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 other Authors

№	Authors	Year	Number of patient with ischemic stroke	Mors	Mortality %
1	Delashaw et all 1990 (118)	1990	13	9	69.2%
2	Steiger et all 1991 (119)	1991	15	10	66.6%
3	Wirtz et all 2002(104)	1997	118	68	57.6%
4	Holtkamp et all 2001(114)	2001	24	12	50%
5	Mori et all 2001 (120)	2002	34	11	32.3%
6	Mori et all 2004 (111)	2001	15	7	46.6%
7	Kuroki et all 2001 (121)	2003	52	20	38.4%
8	Cho et all 2003 (115)	2004	24	6	25%
9	Maramattom et all 2004 (116)	2005	24	10	41.6%
10	Yang et all 2005 (122)	2002	36	11	30.5%
11	Georgiadis et all 2002 (124)	2006	15	3	20%
12	Els et all 2006 (125)	1998	25	11	44%
13	Schwab et all 1998 (95)	2001	50	19	38%
14	Georgiadis et all 2001 (99)	2001	6	1	16.6%
15	Milhaud et all 2005 (94)	2005	10	5	50%
	Total		461	203	44%

Table7 Hemorrhagic stroke incidence and mortality other Authors

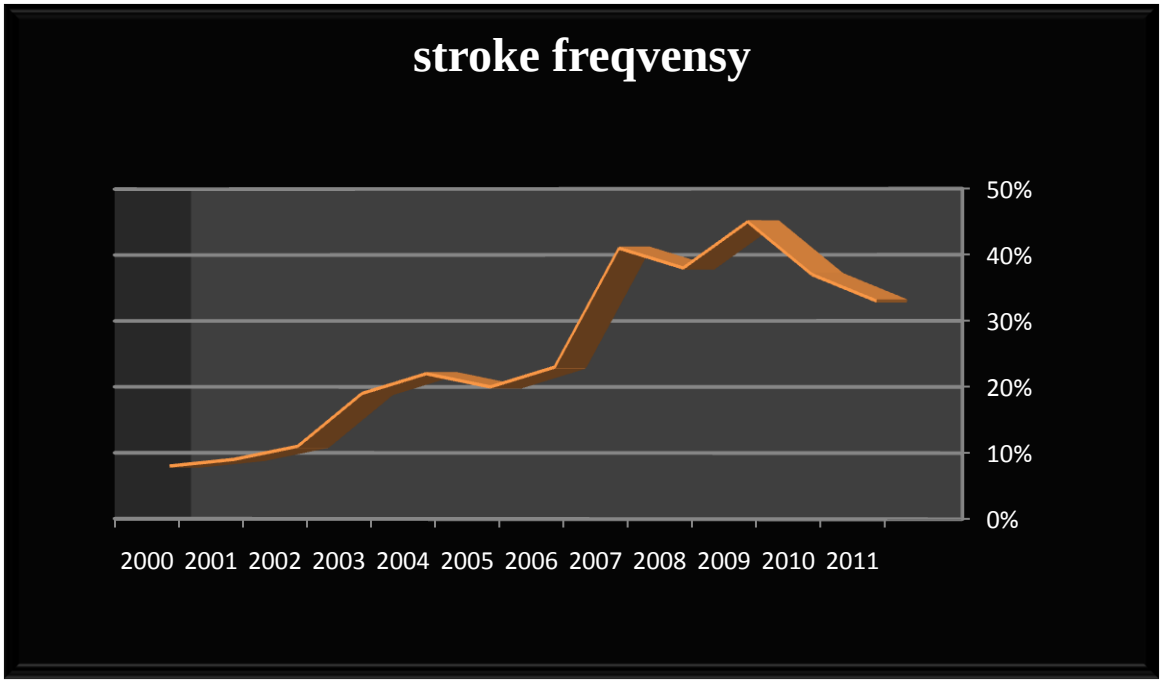
№	Authors	Year	Number of patient with hemorrhagic stroke	Mors	Mortality %
1	R Soissi, W Trabelski, Z Habad, and L Shandrani	2007	24	16	66.6%
2	CHU Fann. Dakar.	2006	51	41	80.4%
3	Fan Shawe M, Venkates B, Boots R.	1994-1999	35	19	54%
4	NBER WORKING PAPER SERIES MEDICAL CARE AT THE END OF LIFE ... by AM Garber	1998	No information	-	70%
5	Author: Denise Nassisi, MD, Assistant Professor, Department of Emergency Medicine, Mount Sinai Medical	2009	No information	-	80%

	Center.				
6	**Total**		**110**	**76**	**70.2%**

Results and discussion

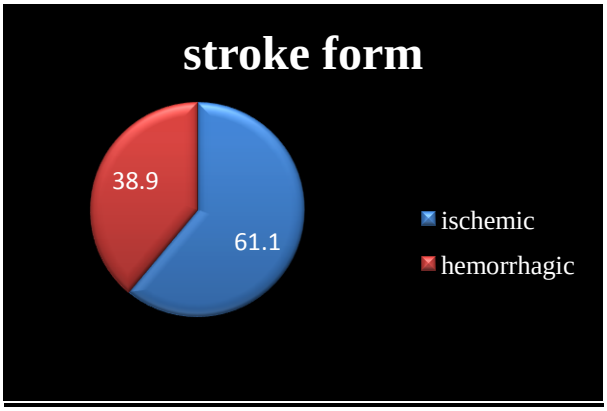
By analyzing yearly annuals of Critical Care Medicine Institute the number of critical stroke patients is abruptly increasing, if in 2000 year the percentage was 8.0% and in 2009 year 45.0% this is 15-20 time increased number (Fig.1). Especially augmentation was mentioned during 2007 and 2009 years.

Fig. 1



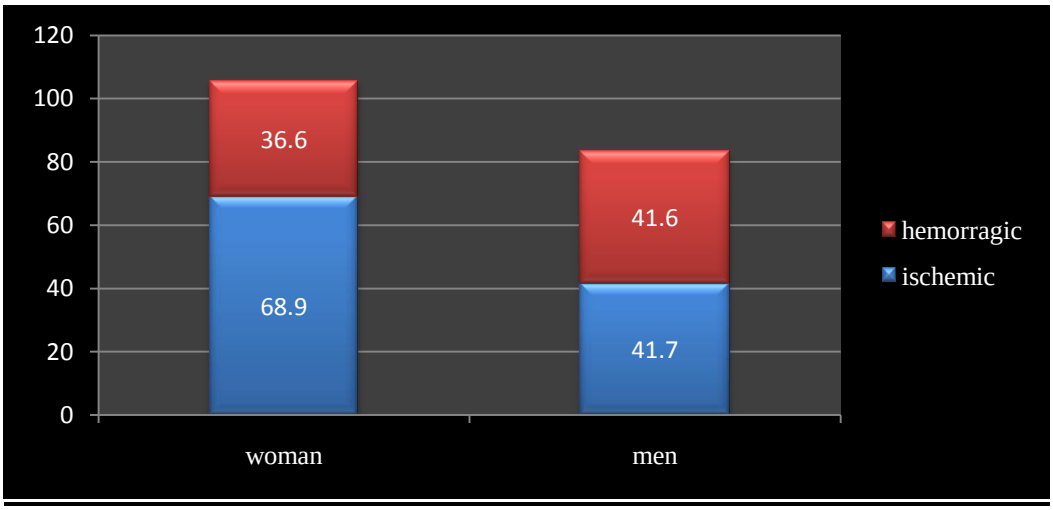
According to the years, in dynamics ischemic stroke is always prevailing than hemorrhagic stroke and in the last few years this difference is more obvious.According to statistics given by Georgian Critical Medicine Institute ischemic stroke is 61.1% and hemorrhagic stroke 38.9%.

Fig.2.

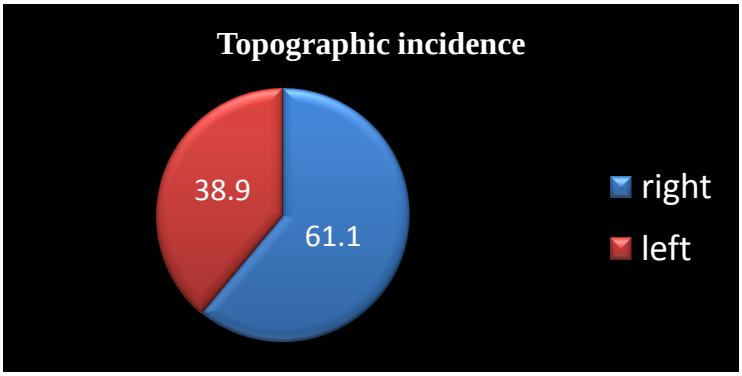


Women stroke incidence rates are greater 57.4% than men 42.6%. Ischemic stroke rates also are more in women 68.9% than in men 47.7%. But hemorrhagic stroke happens more in men41.6%, than in women 36.6%. It has to be mentioned that 1.6 times more common is the development of stroke on the right hemisphere 61.1%, than to the left 38.9%. (Fig. 3)

Fig. 3

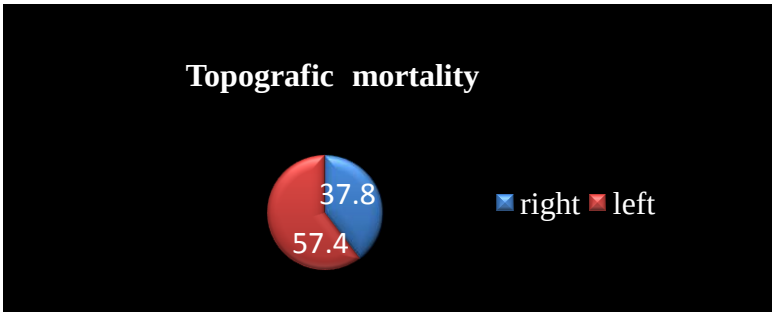


It has to be mentioned that 1.6 times more common is the development of stroke on the right hemisphere 61.1%, than to the left 38.9%. (Fig. 4)

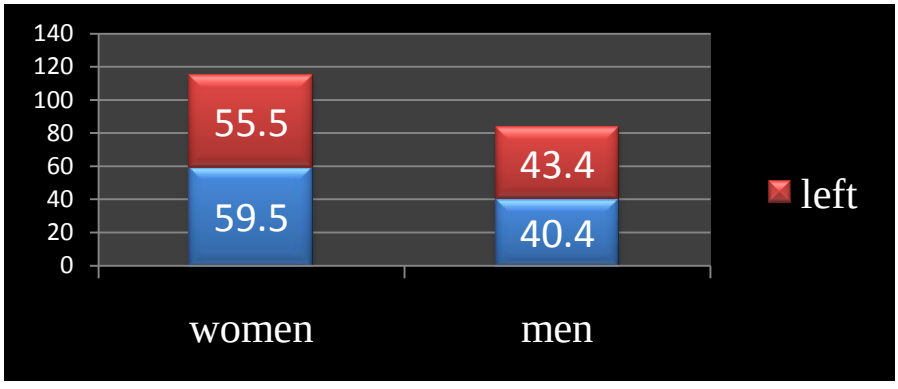


But mortality topography during the hemisphere stroke is 1.7 times more in the left side 62.3%, than in right side 37.2 %.(Fig.5.).

Fig.5.

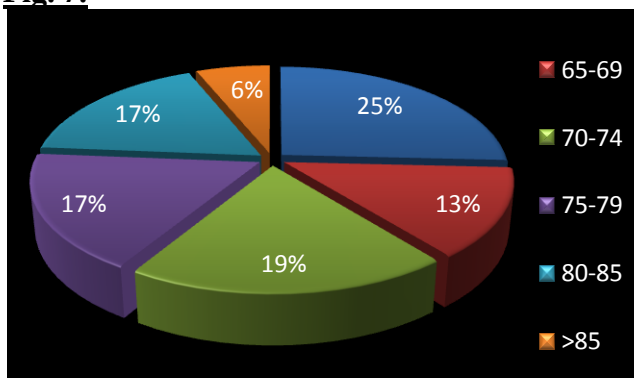


As for the gender distribution the results are following: in women the right side is more 59.5%, than in men 40.0%. And the left side in women is 55.5%, in men it is 43.4 %.(Fig.6.).



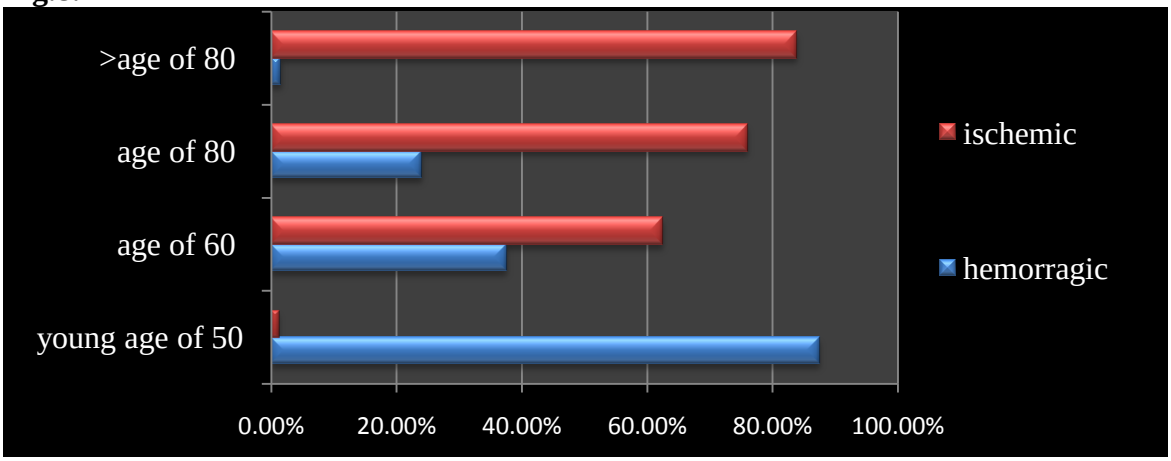
20 years ago it was considered that stroke was the “middle-aged people’s disease”, but recently the stroke became younger. The stroke appears even in 30 year old persons. According to own data its frequency at the age of 54-64 years is 25%, at 65-69- 13%, at 70-74- 19%, at 75-79 and 80-85 -17%, after 85 it drops around 6%. Hence to this, most facts of stroke appears in able-bodied age.

Fig. 7.



In the age of 50, more frequent incidence is hemorrhagic stroke 87.5%, ischemic stroke incidence increases with age 60 - 62%, 76% before the age of 80 and at the age of 80 and above 83.8%.

Fig.8.



In main group where treatment included using of progenitor precursor committing therapy by side of standard treatment, total lethality number constituted 49.5%, in separate: ischemic stroke constituted 31.9%, hemorrhagic stroke 68.3%. In controlled group total lethality constituted 57.1%, in separate: ischemic stroke 44.0%, hemorrhagic stroke 70.2%. At the Georgian Critical Care Medicine Institute's Clinic total lethality number during critical stroke was lower approximately to controlled group data: total lethality 7.6%, observing of ischemic stroke data difference was shown by 12.1%, during hemorrhagic stroke lethality number was ameliorated up to 1.9%.

Bed day incising was in dynamic aspect by side incising of patients number and constituted relative changes from 2000 years and further: in 2003 incised 4 times, 2005 -5 times, 2007 -17 times, 2008 -23 times and 2009 year -26 times, 2010 year -18.3 times, 2011 year -22.5times. Detaining of one patient constituted 3.8bed days.

Stroke is not a problem of only one field, it has social reflection. As it was mentioned above, critical stroke has high lethality index and in our clinic data shows that it is 49.5%. From survived patients, nearly 80.0% needed on bed care after discharging from the hospital. Only 20.0% patients can take care of themselves. Treatment and rehabilitation of patients have high costs and is long lasting as well as the medicaments that are used are very expensive. Merely our clinical findings show that daily direct and indirect expenses are over 400$. One patient treatment mean cost in The Georgian Critical Care Medicine Institute have reached up to 1531$.

Conclusion:

Rate of stroke that is associated with the critical condition rised, hemorrhagic and ischemic strokes develop side by side. Accompanying complication frequently represented as: hypertonic disease and heart dysfunctions. Lethality is 49.3% mainly because of the hemorrhagic stroke, the mortality was about 49.3%, and it happened basically due to the hemorrhage stroke, which suspense ischemic stroke in 26, 8%. Origin of stroke raised in able-bodied population, middle bed day for every patient constituted 4.7, treatment costs have gained to 20035$ despite the limited sources. After liquidation of critical condition disability have high frequency in patients. Independent life can proceed 20.0%, deep disability outcome comes in 76.0%, vegetative condition 4.0%. In process of treatment by Progenitor precursor committing therapy lethality coefficient decreased about 8.3%, better results have been taken during the 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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კრიტიკული ინსულტების შედეგებზე მოქმედი ფაქტორების ანალიზი.

ზ.ხელაძე, ე.ქარცივაძე, ზვ.ხელაძ, ნ.ნინუა, ნ.ქავჯაია

კრიტიკული მედიცინის ინსტიტუტი, თბილისი, საქართველო.

მსოფლიოში 15 მილიონამდე ადამიანია დაავადებული სხვადასხვა ცერებრული პათოლოგიით, მათგან 5-6 მილიონს (30-40%) ინსულტი ემართება. აშშ-ში ყოველწლიურად 700 000 შემთხვევაა, რომელთაგან 500 000 პირველი ინსულტია,

ხოლო 200 000 რეინსულტი (ჩ შშ, შ, ღIჩ, I), ყოველ 45 წამში კი ერთი ინსულტი აღმოცენდება ( ). ამავე ამერიკის ინსულტის ასოციაციის მონაცემებით ინსულტი ახალგაზრდა ასაკში ჭარბობს კაცებში, ხოლო ხანშიშესულ ასაკში ქალებში, ეს შესაძლოა დაკავშირებულია იმასთანაც, რომ ქალებში სიცოცხლის ხანგრძილობა უფრო მეტია, ვიდრე კაცებში. ასევე ინსულტების უმრავლესობა 87.0% არის იშემიური. აშშ-ში 54% ინსულტიანი პაციენტებისა ჰოსპიტალიზაციის გარეშე კვდება, ხოლო მთლიანობაში ინსულტით სიკვდილობა 59.0%-ია. აღსანიშნავია, რომ პირველ 30 დღეში კვდება 8.0%-დან-12.0%-მდე იშემიური და 37.0%-დან-38.0% ჰემორაგიული ინსულტით პაციენტი 45დან-64 წლამდე ასაკში, 65 წლის ზემოთ ასაკში 8,1% იშემიური და 44,6% ჰემორაგიული ინსულტით. 2007 წელს აშშ-ში §62.7 მილიარდი დაიხარჯა, საშუალოდ კი იშემიური ინსულტის მკურნალობაზე რეაბილიტაციის ჩათვლით §140 048 იხარჯება. ინსულტის მწვავე პერიოდში ხარჯების ძირითადი შემადგენელი ნაწილებია პალატის და მომსახურების ღირებულება 50.0%, მედიკამენტების 21.0%, სადიაგნოზო 19.0%. საქართველოს კრიტიკული მედიცინის ინსტიტუტში შესწავლილი იქნა ინსულტით დაავდებული 1010 (100%) ავადმყოფი, რომლის 54,3% იშემიური ინსულტია, ხოლო 45.7% ჰემორაგიული. კომის ხარისხი ყველა ავადმყოფში ჩშ-8 და ნაკლები იყო. სიკვდილიანობამ შეადგინა 49.5%, იშემიური ინსულტის 31.9 %, ჰემორაგიული ინსულტის 68.3%. საწოლ-დღეთა რაოდენობა 3867-ია, ხოლო ერთი პაციენტის საწოლზე დაყოვნება 3.8 საწოლ-დღე. მკურნალობის სტანდარტი მოიცავდა რესპირატორულ (შI V, შ & ჩ ოდეს) 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) და ანტიბაქტერიულ პრეპარატებს. ტრადიციული თერაპიის დამატებით ინსულტის მწვავე პერიოდში ტარდებოდა პროგენიტური პრეკურსორების კომიტირების მართვა ნიტროგლიცერინით, ელექტროდენით და პლაზმური სხივებით (ზვ.ხელაძე და თანაავტ., პატენტი №10786/01; ზვ.ხელაძე და თანაავტ., პატენტი №10792/01; ზვ.ხელაძე და და თანაავტ., პატენტი №10810/01}. კვლევის პროცესში დადგინდა, რომ არსებობს გარკვეული დემოგრაფიული და ტოპოგრაფიული ვარიაბელობები

ინსულტების ფორმის და მხარეობის მიხედვით. განვსაზღვროთ ინსულტის წინასწარი პროგნოზი, რითიც გარკვეულწილად შევამცირებთ მის ხარჯებს.

გასაღები სიტყვები: ინსულტის მკურნალობა, პროგენიტური პრეკურსორების კომიტირება, კრიტიკული პაციენტი.