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THE ANALYSIS OF MORTALITY RATES IN PATIENTS WITH ACUTE ISCHEMIC STROKE IN A HOSPITAL AT DIFFERENTIATED INFUSION THERAPY

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Abstract

Acute cerebrovascular accident (CVA) is a major cause of morbidity and mortality of the adult population in the world and is in fourth place in the structure of mortality after cancer, cardiovascular diseases and respiratory diseases. Today conducted an intensive search for new materials or new schemes of use existing drugs that could improve current already known treatment of CVA or become the basis for a new more effective and safe drug.

The purpose of the work. Conduct analysis of hospital mortality of patients with ischemic CVA on a background of differentiated infusion therapy with various infusion solutions.

Materials and methods. As test solutions been used izoosmolar 0.9% solution of NaCl, colloidal izoosmolar solution of Voluven, colloidal hyperosmolar solution of Hekoton, hyperosmolar solution mannitol in groups of patients. Investigated solutions were administered intravenously in conditionally effective dose of 2.5 ml/kg 2 times per day (5 ml/kg per day) (determined experimentally) and then every day every 12 hours for 7 days immediately upon confirmation of the diagnosis using spiral computed tomography (SCT). For the control group were taken patients treated only with infusion solution of 0.9% NaCI, the comparison group were patients received 0.9% NaCI solution+Voluven or Hekoton or Mannitol. The main selection criterion of patients was the presence of CVA by the ischemic type and minds lower of 12-13 score by the Glasgow Coma Scale.

Results and discussion. Analyzing the overall structure of mortality should be noted that in the first two days of treatment were not observed deaths in either group of patients with CVA by ischemic type in hospital. At the end of observation overall mortality rate of patients for each study group was: 0,9% NaCl - 8 (32%), Voluven - 6 (24%), hekoton - 3 (12%), mannitol - 8 (32%). Carrying out the statistical analysis of intergroup mortality rate should be noted that only a group of Hekoton which showed the lowest mortality has the significant difference ($p = 0.09$) compared with groups of 0,9% NaCl and mannitol. Comparing the group of Voluven and Hekoton can talk about different mortality which amounted to 6 (24.0%) and 3 (12.0%) at the end of observation but significant differences between them were not ($p = 0.27$). Daily analysis of the dynamics of growth of stationary mortality shows the comparability of this indicator in the group of 0,9% NaCl and Mannitol and was from the fifth day 8% vs. 32% ($p = 0.03$). A group of Voluven showed slightly better results so the growth of mortality was 0% vs. 24% ($p = 0.009$) from the 3rd day. Only the growth rate of stationary mortality was not statistically significant value and accounted for ($p> 0.06$) in a group of hekoton.

Conclusions

1. The total mortality rate of patients scheduled for each of the group: 0,9% NaCl - 8 (32%), Voluven - 6 (24%), Hekoton - 3 (12%), Mannitol - 8 (32%).

2. Analysis of the mortality rate showed that only group of Hekoton had the least reliable mortality ($p = 0.09$) compared with groups of 0,9% NaCl and Mannitol in patients with acute ischemic stroke in the hospital with differentiated infusion therapy.

3. Comparison of the groups of Voluven and Hekoton showed no significant difference ($p = 0.27$) and growth rate of stationary mortality was not statistically significant value and accounted for ($p> 0.06$) only in the group of Hekoton.

Keywords: cerebrovascular accident, ischemic stroke, infusion therapy.

Acute cerebrovascular accident (CVA) is a major cause of morbidity and mortality of the adult population in the world and is in fourth place in the structure of mortality after cancer, cardiovascular diseases and respiratory diseases [1, 2]. They relate to 10% of all deaths: in the acute phase mortality is 35%, by the end of the first year after suffering a stroke increased by 12-15%. Both direct and indirect losses of society from the disease is extremely

significant, so the problem of CVA went beyond medical science and practice, acquiring important social and economic significance [3]. As part of cerebrovascular disease ischemic strokes consist 70-85% of cases in Ukraine [2]. The highest mortality observed in extensive stroke in carotid pool - up to 60% within the first year [3]. Temporary or permanent incapacitation has about 10% of direct and indirect losses of the health budget of Ukraine and around the world [4].

Pharmacotherapy of patients with CVA is a difficult task that requires collaboration of neurologists, emergency physicians to conduct a comprehensive intensive care, the effectiveness of which is primarily directed at stabilization of basic vital functions and preserve the viability of functionally active neurons [4, 5].

The main in drug therapy is a gap of pathogenetic chain of ischemic cascade in patients with ischemic CVA that can be achieved involving to the treatment protocols of nosology drugs with neuroprotective properties [6]. Despite the fact that every year there are new drugs with cerebroprotective properties and in many cases the experimental results were very promising but currently none of these substances (except cerebrolysin and citicoline, which is being studied in large clinical trials) are not demonstrated clinically meaningful results of the treatment of ischemic stroke [7, 8].

Today conducted an intensive search for new materials or new schemes of use existing drugs that could improve current already known treatment of CVA or become the basis for a new more effective and safe drug [9].

The purpose of the work. Conduct analysis of hospital mortality of patients with ischemic CVA on a background of differentiated infusion therapy with various infusion solutions.

Materials and methods. A randomized prospective controlled study of patients with CVA by the ischemic type was conducted at the Vinnytsia City Clinical Hospital of ambulance from 2013 to 2016 in the neurology department and intensive care unit and anesthesia №1 and 2. As test solutions been used izoosmolar 0.9% solution of NaCl, colloidal izoosmolar solution of Voluven, colloidal hyperosmolar solution of Hekoton, hyperosmolar solution mannitol in groups of patients.

The studied patients were divided into 4 groups each with 25 patients.

The 1st group (group of 0.9% NaCI): patients with acute ischemic stroke which obtained izoosmolar solution of 0.9% NaCI in addition to standard treatment in the acute phase of CVA.

The 2nd group (group of Voluven): patients with acute ischemic stroke which obtained izoosmolar solution of 0.9% NaCI + colloidal izoosmolar solution Voluven in addition to standard treatment in the acute phase of CVA.

The 3rd group (group of Hekoton): patients with acute ischemic stroke which obtained izoosmolar solution of 0.9% NaCI + colloidal hyperosmolar solution Hekoton in addition to standard treatment in the acute phase of CVA.

The 4th group (group of mannitol): patients with acute ischemic stroke which obtained izoosmolar solution 0.9% NaCI + hyperosmolar solution mannitol in addition to standard treatment in the acute phase of CVA.

Investigated solutions were administered intravenously in conditionally effective dose of 2.5 ml/kg 2 times per day (5 ml/kg per day) (determined experimentally) and then every day every 12 hours for 7 days immediately upon confirmation of the diagnosis using spiral computed tomography (SCT). For the control group were taken patients treated only with infusion solution of 0.9% NaCI, the comparison group were patients received 0.9% NaCI solution+ Voluven or Hekoton or Mannitol. All groups of comparison received not only the test solution in a particular dose but 0.9% NaCI solution because waive this infusion solution impossible. 0.9% NaCI solution needed as the basis for the diluting of basic medicines and for correction of volemia (one recommended infusion solutions for euvolemia according to protocol №602). Basic therapy is determined according to the Order of MoH of Ukraine from 03.08.2012 № 602 and not contradicted therein. Analysis of mortality of patients performed daily during the staying of patients in hospital. The main selection criterion of patients was the presence of CVA by the ischemic type and minds lower of 12-13 score by the Glasgow Coma Scale.

Criteria for including of patients in the study: men and women; age from 18 to 85 years; CVA in patients by ischemic type (SCT confirmed); the ability of the patient or his relatives to adequate cooperation during the investigation. Exclusion criteria of patients from the trial: pregnancy; lactation; anuria; hyperosmolar coma; conditions which do not show the introduction of large volumes fluid (cranial trauma, cerebral hemorrhage, decompensated heart failure, oliguria and anuria due to organic disease of the kidneys); presence of complications that cause the need for the appointment of additional infusion therapy with blood, parenteral nutrition; presence of concomitant decompensated diseases (diabetes, chronic renal failure) or acute conditions that can significantly affect the results of research; participation in another clinical trial.

Statistical analysis of results of research was performed using nonparametric methods for assessing of obtained results by the methods of variation statistics using the program StatSoft "Statistica" v. 6.0 according to recommendations [10].

Results and discussion. Analyzing the overall structure of mortality should be noted that in the first two days of treatment were not observed deaths in either group of patients with CVA by ischemic type in hospital (see Table 1). Since the 3rd day of observation there were 2 deaths only in group with 0,9% NaCl representing 8% of patients in this group and is not a statistically significant result ($p = 0.15$) in comparison with other groups of observation. The analysis of 4th day of treatment showed that in the group with Voluven and Hekoton were registered deaths. In the group of Voluven died two patients on the fourth day (8% of patients in this group) and in the group of Hekoton died only 4% which is one of the patient from this group. Mortality rates remained at the same level respectively 2 (8%) and 0 (0%)for patients with 0,9% NaCl and mannitol. Carrying out the statistical analysis between each group of observations reliability between mortality rates was not on the fourth day (see Table 1).

Rate of mortality lines up and was: 2 (8%) cases in all investigated groups on the fifth day of observation. It is worth noting the appearance of 2 deaths in the group of mannitol and one more in the group of hekoton compared to the fourth day. New deaths were not observed in patients who received 0,9% NaCl and Voluven on the 5th day. Therefore, intergroup statistical analysis of mortality rates showed no statistically significant intergroup difference on the fifth day of observation.

Sixth day of treatment of four studied groups shows the growth of mortality rate in two of them. Mortality rate grows twice in the group with 0,9% NaCl and Mannitol and constitutes accordingly 4 (16%) for each of them compared to the 5th day. Deaths from Voluven and Hekoton were not detected and the mortality rate was about the same: 2 (8%) for each group accordingly on the 6th day of observation. Statistically significant intergroup differences in mortality rate was not on the period of observation.

Table 1

The total number of deaths in groups with different solutions during hospital stay

Day of observation	Number of deaths patients in groups with different solutions				P1-2	P1-3	P1-4	P2-3	P2-4	P3-4
	1.NaCl n=25	2.Volyuven n=25	3.Hekoton n=25	4.Mannitol n=25						
1 day	0	0	0	0	-	-	-	-	-	-
2 day	0	0	0	0	-	-	-	-	-	-
3 day	2(8,0%)	0 (0)	0 (0)	0 (0)	0,15	0,15	0,15	-	-	-
4 day	2(8,0%)	2(8,0%)	1(4,0%)	0 (0)	1,00	0,55	0,15	0,55	0,15	0,31
5 day	2(8,0%)	2(8,0%)	2(8,0%)	2(8,0%)	1,00	1,00	1,00	1,00	1,00	1,00
6 day	4(16,0%)	2(8,0%)	2(8,0%)	4(16,0%)	0,38	0,38	1,00	1,00	0,38	0,38
7 day	4(16,0%)	3(12,0%)	2(8,0%)	4(16,0%)	0,68	0,38	1,00	0,64	0,68	0,38
Died in hospital after 7 days	4(16,0%)	3(12,0%)	1(4,0%)	4(16,0%)	0,68	0,15	1,00	0,30	0,68	0,15
Totally died in the group	**8(32,0%)**	**6 (24,0%)**	**3(12,0%)**	**8(32,0%)**	**0,52**	**0,09**	**1,00**	**0,27**	**0,53**	**0,09**

It should be noted comparability of fatality rates for groups of mannitol and 0,9% NaCl which consisted 4 (16%) patients accordingly on the seventh day observation. In patients who received Voluven is observed increase in mortality to 3 (12%) patients compared to the previous day. Mortality of patients remains not variable from 5 th day only and is accordingly 2 (8%) in a group of Hekoton. Intergroup statistical analysis did not notice significant differences in this observation period.

Taking into account the fact that statistically significantly intergroup difference was not in patients stay in hospital the analysis of mortality rates was conducted throughout the patient's stay in hospital. Further analysis of mortality rates showed an increase in the studied parameters in each group to: 0,9% NaCl - 4 (16%), Voluven - 3 (12%), hekoton - 1 (4%), mannitol - 4 (16%) after the 7th day.

At the end of observation overall mortality rate of patients for each study group was: 0,9% NaCl - 8 (32%), Voluven - 6 (24%), hekoton - 3 (12%), mannitol - 8 (32%). Carrying out the statistical analysis of intergroup mortality rate should be noted that only a group of Hekoton which showed the lowest mortality has the significant difference (p = 0.09)

compared with groups of 0,9% NaCl and mannitol. Comparing the group of Voluven and Hekoton can talk about different mortality which amounted to 6 (24.0%) and 3 (12.0%) at the end of observation but significant differences between them were not (p = 0.27).

Daily analysis of the dynamics of growth of stationary mortality shows the comparability of this indicator in the group of 0,9% NaCl and Mannitol and was from the fifth day 8% vs. 32% (p = 0.03). A group of Voluven showed slightly better results so the growth of mortality was 0% vs. 24% (p = 0.009) from the 3rd day. Only the growth rate of stationary mortality was not statistically significant value and accounted for (p> 0.06) in a group of hekoton.

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