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CLINICAL AND NEUROLOGICAL DYNAMICS IN ISCHEMIC STROKE AGAINST THE BACKGROUND OF EMERGENCY X-RAY ENDOVASCULAR THROMBOASPIRATION

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ABOUT ARTICLE

Key words: ischemic stroke, thromboaspiration, endovascular treatment, neurological dynamics, clinical results, cerebral circulation.

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Abstract: Ischemic stroke is a serious disease caused by the reduction or cessation of blood flow to the brain as a result of impaired cerebral circulation. This article examines the emergency X-ray endovascular thromboaspiration method used in the treatment of ischemic stroke. The ability to remove blood clots from cerebral blood vessels by the thromboaspiration method, the effect on the clinical and neurological dynamics of patients is analyzed. Research results show that this method has a positive effect on the effectiveness of the method, the recovery process and the quality of life of patients.

FAVQULODDA RENTGEN ENDOVASKULYAR TROMBOASPIRATSIYA FONIDA ISHEMIK INSULTDA KLINIK VA NEVROLOGIK DINAMIKA

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MAQOLA HAQIDA

Kalit so‘zlar: ishemik insult, tromboaspiratsiya, endovaskulyar davolash, nevrologik dinamika, klinik natijalar, serebral qon aylanishi.

Annotatsiya: Ishemik insult serebral qon aylanishining buzilishi natijasida miyaga yetkaziladigan qon oqimining kamayishi yoki to‘xtashi tufayli yuzaga keladigan jiddiy kasallikdir. Ushbu maqolada ishemik insultning davolashida qo‘llaniladigan favqulodda rentgen endovaskulyar tromboaspiratsiya usuli o‘rganilgan. Tromboaspiratsiya usuli orqali miya qon tomirlarida paydo bo‘lgan tromblarni olib tashlash mumkinligi, bemorlarning klinik va nevrologik dinamikasiga ta’siri tahlil qilinadi. Tadqiqot natijalari bu usulning samaradorligi, bemorlarning tiklanish jarayoni va hayot sifatiga ijobiy ta'sir ko‘rsatishini ko‘rsatadi.

КЛИНИКО-НЕВРОЛОГИЧЕСКАЯ ДИНАМИКА ПРИ ИШЕМИЧЕСКОМ ИНСУЛЬТЕ НА ФОНЕ НЕОТЛОЖНОЙ РЕНТГЕНЭНДОВАСКУЛЯРНОЙ ТРОМБАСПИРАЦИИ

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О СТАТЬЕ

Ключевые слова: ишемический инсульт, тромбоаспирация, эндоваскулярное лечение, неврологическая динамика, клинические результаты, мозговое кровообращение.

Аннотация: Ишемический инсульт — тяжелое заболевание, обусловленное снижением или прекращением притока крови к мозгу в результате нарушения мозгового кровообращения. В данной статье рассматривается экстренный рентгенэндоваскулярный метод тромбоаспирации, применяемый в лечении ишемического инсульта. Проанализирована возможность удаления тромбов из сосудов головного мозга методом тромбоаспирации, влияние на клиническую и неврологическую динамику пациентов. Результаты исследований показывают, что данный метод оказывает положительное влияние на эффективность метода, процесс восстановления и качество жизни пациентов.

Relevance: Cerebrovascular pathology remains one of the most significant problems in medicine due to the high percentage of morbidity, disability and mortality.

In the structure of acute cerebrovascular accidents (ACVA), ischemic stroke (IS) predominates, accounting for about 80% of all cases of the disease. Recently, an active search for effective methods of treating IS has been conducted worldwide [2,3]. Intravenous thrombolytic therapy with alteplase remains the “gold standard” for treating patients with IS in the “therapeutic window” in the absence of contraindications [6]. However, it should be taken into account that blood clots in larger diameter vessels are practically not amenable to the pharmacological effects of the drug, which limits the effectiveness of intravenous thrombolytic therapy for occlusion in the proximal sections.

Endovascular contact (aspiration) thromboextraction and mechanical thrombectomy (MTE) are modern methods of treating IS, contributing to the rapid recovery of patients and reducing the risk of adverse outcomes (1,4,5).

The aim of the study: To evaluate the clinical and neurological dynamics in ischemic stroke against the background of emergency X-ray endovascular thromboaspiration

Materials and research methods: The studies were conducted at the neurological department of the Republican Scientific Center for Emergency Medical Care from 2022 to 2024. A total of 140 people were examined, of which 64 (45.7%) patients were male, 76 patients (57.4%) were female, aged 41 to 79 years in the acute and acute periods of ischemic stroke (IS) in the carotid and vertebrobasilar. Confirmation of the type of cerebrovascular accident is based on anamnestic data, neurological examination and neuroimaging data (CT and MRI of the brain).

Based on the purpose and objectives of this study, the subjects (n=140) were divided into the following groups. The main group (MG) consisted of 70 (50.0%) patients with IS (cardioembolic and atherothrombotic variants) against the background of emergency X-ray endovascular thrombospiration (ERECT). The comparison group (CG) included 70 (50.0%) patients with IS without emergency X-ray endovascular thrombospiration (Table 1).

Table 2.2 shows the distribution of patients by age and gender. The MG included 40 (57.1%) women and 30 (42.9%) men. The average age of men was 64.9 ± 8.1 years, and that of women was 68.1 ± 7.5 years. The CG included 36 women (51.4% of the MG patients) and 34 men (48.6%); the average age of men and women was 66.8 ± 8.2 years and 68.0 ± 7.1 years, respectively.

Table1.

Characteristics of the groups of patients examined

Group	Number of patients		Qualifying feature
	abs	%	
Main group (MG)	70	50,0%	Patients with ischemic stroke (cardioembolic and atherothrombotic variants) undergoing emergency X-ray endovascular thromboaspiration
Comparison group (CG)	70	50,0%	Patients with ischemic stroke (cardioembolic and atherothrombotic variants) without emergency X-ray endovascular thromboaspiration
Total	140	100,0%	All subjects

Table 2 shows that the study groups mainly included middle-aged and elderly patients (WHO, 2022). In the MG, the proportion of middle-aged and elderly patients was 45.7% (32 people), and in the CG - 37.1% (26 people), respectively.

In the CG, the proportion of middle-aged and elderly patients was 31.4% (22 people), and in the CG - 42.9% (30 people), respectively (Table 2). Elderly and senile individuals with concomitant somatic pathology more often fell into the exclusion criteria in the MG. The gender composition in the age categories did not have any special differences.

To objectify the severity of the condition, the severity of focal neurological deficit and assess the dynamics of clinical indicators, the National Institutes of Health Stroke Scale (NIHSS) was used, the degree of functional recovery was assessed using the modified Rankin scale.

Table 2.

Distribution of patients by age and gender

Groups	gender		Age WHO, 2022				
			18 - 44 years old - young, n=12	45 - 59 years - average, n=54	60 - 74 years old - elderly, n=58	75 - 90 years old - elderly, n=18	Total, n=70
MG, n=70	**M n=30**	**abs**	2	14	12	2	30
		%	6,7%	46,7%	40,0%	6,7%	42,9%
	F n=40	**abs**	4	18	14	4	40
		%	10,0%	45,0%	35,0%	10,0%	57,1%
	total	**abs**	6	32	26	6	70
		%	8,6%	45,7%	37,1%	8,6%	100,0%
CG , n=70	**M n=34**	**абс**	2	10	16	6	34
		%	5,9%	29,4%	47,1%	17,6%	48,6%
	F n=36	**abs**	4	12	14	6	36
		%	11,1%	33,3%	38,9%	16,7%	51,4%
	total	**abs**	6	22	30	12	70
		%	9%	31%	43%	17%	100%

Total, n=140	**M n=64**	**abs**	4	24	28	8	64
		%	6,5%	38,7%	45,2%	12,9%	45,7%
	F n=76	**abs**	8	30	28	10	76
		%	10,5%	39,5%	36,8%	13,2%	54,3%

The obtained data indicate the effectiveness of emergency X-ray endovascular thromboaspiration (ERECT) in the acute period of ischemic stroke in comparison with conventional therapy. Emergency X-ray endovascular thromboaspiration was used in patients of the MG. Conventional therapy (basic and differentiated) was performed in patients of the CG.

Calculation of the vegetative index of blood circulation (VIC) allows to quantitatively determine the state of the vegetative tone of the cardiovascular system and evaluate it in dynamics, comparing with the physiological state of the patient. When the sympathetic nervous system is activated, an increase in the stroke and minute volumes of the heart is observed. On this basis, the proposed VIC includes all the main parameters of systemic hemodynamics: heart rate (HR), systolic blood pressure (SBP) and pulse pressure (PBP, the difference between systolic and diastolic blood pressure). The calculation is made using the following formula:

$$\mathbf{VIC = k \cdot (HR / 60 мин.-1)2 \cdot SBP / PBP,}$$

where VIC is the vegetative index of blood circulation; k is the dimensional empirical coefficient equal to 2 s2 (where 2 is the correction factor multiplied by 1 second squared); PBP is the pulse arterial pressure, mmHg; SBP is the systolic arterial pressure, mmHg; HR is the heart rate per minute..

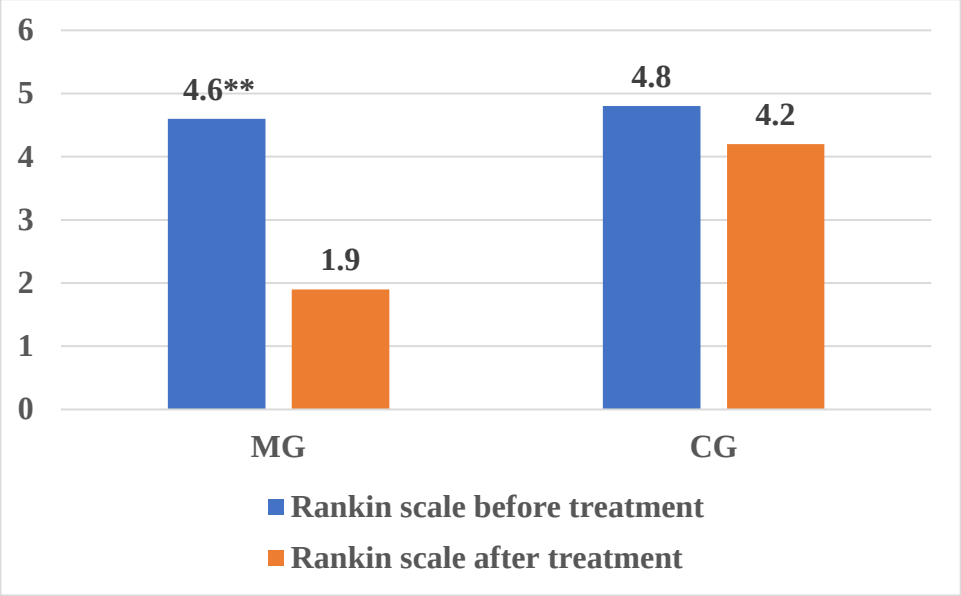
Quantitative values of the VPK at different levels of predominance of the influence of the sympathetic or parasympathetic nervous system are measured in conventional units (c.u.). Normal vegetative tone (eutonia) corresponds to a VPK value of 0.95–1.05 c.u.

Statistical processing of the obtained data was carried out on a personal computer using the program “Statistica 8.0”. The Student’s criterion was considered reliable at $p<0.05$.

Research results: Neurological symptoms of the patients under study were characterized by symptoms of focal lesions of one or the other hemisphere of the brain. Against the background of the treatment, different dynamics indicators were noted in the dynamics of patients with IS over 7 days, depending on the use of ERECT.

According to the Rankin scale, the MG and CG initially had high values of -4.6+0.7 and 4.8+0.4 points, respectively. During the treatment, the scores significantly decreased to 1.9+0.3 and 4.2+0.7, respectively (Fig. 1).

After treatment in the MG, highly reliable positive dynamics were observed compared to the CG. Within a short time - 7 days - in the MG after ERECT, a rapid and indicative regression of symptoms was observed.



*Here and further: Note: reliability of differences * - $p < 0.05$; **- $p < 0.005$.*

Figure 1. Dynamics of Rankin scale indicators during the observation period.

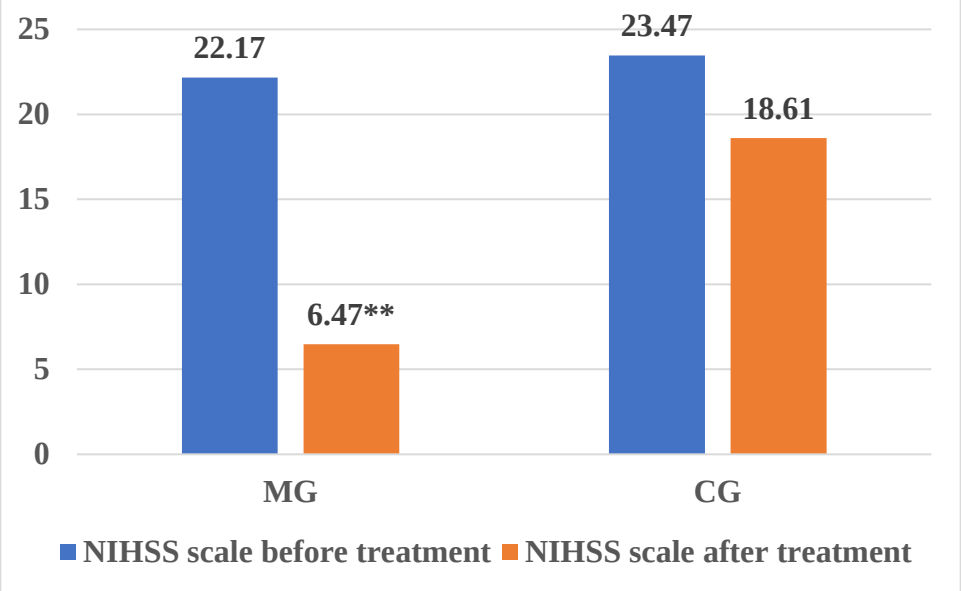


Figure 2. Dynamics of changes in indicators on the NIHSS scale.

According to the NIHSS scale used to determine the level of neurological deficit in the OG and GS, the following indicators were initially available: 22.17 and 23.47 points, respectively. In dynamics, the NIHSS indicators improved against the background of treatment, especially these were highly significant in the OG ($p<0.005$) and insignificant changes in the GS: 6.47 and 18.61, respectively. The result is shown in (Fig. 2).

After 7 days, patients with MG after the use of ERECT also showed a decrease in cognitive deficit. In CG, patients who were on standard therapy showed slower dynamics of recovery of neurological status and cognitive sphere..

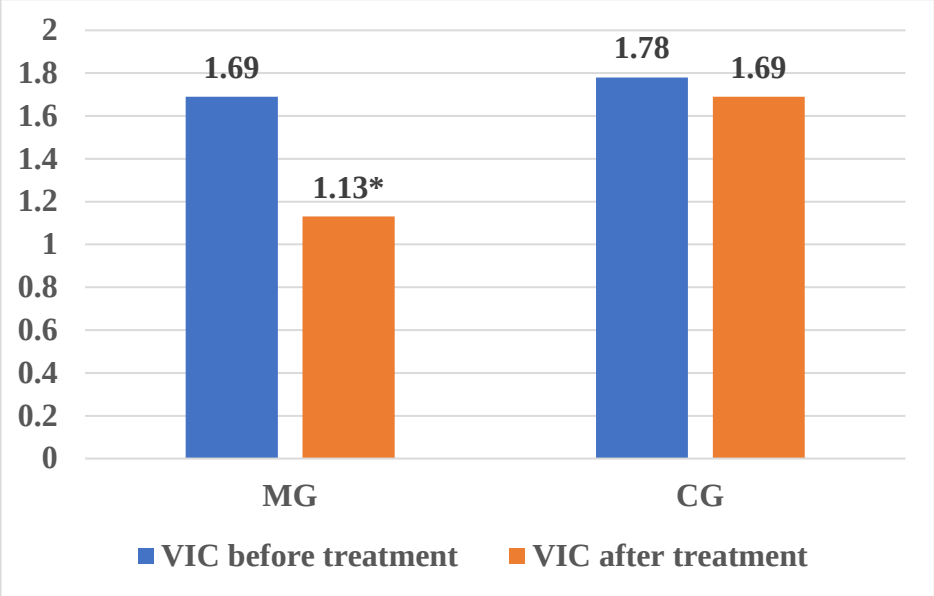


Figure 3. Dynamics of changes in VIC indicators

In patients of the CG, there was no decrease in sympathicotonia according to the *VIC* indicator, in the MG we observed better results of normalization of the vegetative balance (p.3). Thus, the *VIC* in the MG before treatment was 1.69+0.5, after treatment 1.13+0.2 ($p<0.05$), in the CG the *VIC* before treatment was 1.78+0.5, after treatment 1.69+0.8.

Thus, it can be concluded that against the background of emergency X-ray endovascular thromboaspiration in patients with ischemic stroke, the restoration of neurological deficit is much better, it should also be noted that the reduction in sympathicotonia in the acute period of ischemic stroke reduces the risk of developing severe forms of ischemic stroke and early mortality in the acute period.

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