MODERN APPROACHES TO THE TREATMENT FOR ISCHEMIC STROKE IN PATIENTS IN THE KRASNODAR TERRITORY

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ABSTRACT

Acute cerebrovascular accident remains one of the most important issues of modern clinical neurology and holds a leading place among the causes of disability and mortality. The cerebral stroke has not only medical, but also social and economic effects, as it accounts for disability in population. According to the National Register, 31% of stroke patients require constant care, 20 % of patients cannot walk unassisted and only 20% of patients return to their previous work.

New approaches to the treatment for ischemic stroke include the use of modern high-performance reperfusion of the brain during the first hours of the disease.

The case of reperfusion therapy in a patient, performed twice with an interval of 8 months in Prof. S.V. Ochapovsky Regional Clinical Hospital No. 1 of the Ministry of Health of the Krasnodar Territory is reported.

Keywords: ischemic stroke, reperfusion therapy, selective and systemic thrombolysis.

ACA – anterior cerebral artery
AV – aortic valve
BT – brachiochepalic trunk
CCA – common carotid artery
CT – computed tomography
CVA – cerebrovascular accident
ECA – external carotid artery
ICA – internal carotid artery
LAD – left anterior descending artery
LV – left ventricle
MCA – middle cerebral artery
MRI – magnetic resonance imaging
RVC – Regional Vascular Center
TLT – thrombolytic therapy
VA – vertebral artery

INTRODUCTION

Acute cerebrovascular accident (CVA) remains one of the most important issues of modern clinical neurology and occupies the leading place among the causes of morbidity and mortality [1]. The cerebral stroke has not only medical but also social and economic importance, since the stroke is a major cause of disability in the population. According to the National Register, 31% of stroke patients require constant care, 20 % of patients cannot walk unassisted and only 20% of patients return to their previous work.

In the Krasnodar Territory, more than 17 thousand of CVA cases are registered annually, which is 50—60 cases per day. The average mortality in the acute period is 25—35% and in some regions it reaches 50%. A noticeable fact is that our region (since 2011) characterized by a high rate of hospitalization of patients with the stroke (95—98%).

International experience shows that the decline in mortality resulting from cardiovascular diseases is achieved through a coordinated package of measures, the most important of which is to increase public awareness of the risk factors for cardiovascular diseases and their prevention, introduction of effective prevention programs and improving the system of care for the stroke. The set of measures improving medical care for patients suffering from cardiovascular diseases in Russia is based on the Federal target program "Prevention and control of socially significant diseases" in 2007—2011 and in the Order of the RF Ministry of Health of June 4, 2009 No. 368n. The complex includes three main areas.

1. Primary and secondary prevention of vascular diseases.
2. Improving the system of medical care for the cerebrovascular disease.
3. Epidemiological monitoring.

New approaches to the treatment for the ischemic stroke include the use of modern high-performance methods of reperfusion of the brain during the first hours of the disease by restoring blood flow in the affected vessels, which helps prevent the development of irreversible damage of the brain, or reduce the amount of destruction, i.e. to minimize the degree of disability.

Introduction of modern methods of reperfusion therapy has become possible only due to the target program, which resulted in opening of effectively operating 14 primary vascular departments and 4 regional vascular departments in the Krasnodar Region. The main condition for the opening of a specialized vascular department is its geographical location and accessibility of care for each resident within 30—40 min.

MATERIAL AND METHODS

According to recommendations, reperfusion therapy is used in two versions: as a the systemic thrombolysis when the drug is administered intravenously during the first 4—5 hours after the onset of the disease, and as a selective intra-arterial thrombolysis

where fibrinolytic drug is introduced into an occluded artery in the immediate area of the thrombus localization when the temporal interval from the onset of the disease does not exceed 6—8 hours.

We report our clinical experience with modern methods of reperfusion therapy in one patient, twice with an interval of 8 months.

Clinical case

A 74-year-old male patient A. fell acutely ill on September 24, 2012 at 8:50 a.m., when weakness in the right limbs and abnormal speech appeared. The man was admitted to a local hospital at 10:10 a.m. The patient was reported through the air ambulance, emergency transportation to the Regional Vascular Center (RVC) located at a distance of 60 km was recommended. At 12:05 p.m., the patient was hospitalized in RVC No. 2 of Regional Clinical Hospital No. 1 for having the selective thrombolytic therapy.

Neurological status upon admission to the RVC: the patient is conscious, has motor aphasia, and performs instructions partly after multiple repetitions. Meningeal symptoms are absent. Eye slits D=S. Pupils are symmetrical, 4 mm, photoreaction is preserved. Nystagmus is absent. The face is asymmetrical: the right corner of the patient's mouth is down-turned. The tongue deviates to the right side. Swallowing is not impaired (according to the swallowing test). The soft palate is movable. Reflexes of oral automatism are positive. Active movements are restricted in the right extremities. Muscle strength of the right hand — 0, of the left hand — 5, of the right leg — 0, of the left leg — 5. Muscle tone is reduced on the right side. The deep reflexes of the upper extremities — D <S, of the lower extremities — D <S. Sensory disorders cannot be assessed in view of speech disorders. The patient performs dynamic coordination tests with the left limbs satisfactorily and controls pelvic organs functions. Upon admission: NIH scale — 17 points, the Rivermead mobility index — 1 point, the modified Rankine scale – grade 4.

The computed tomography (CT) of the brain has not revealed focal or massive lesion.

Given the absence of contraindications, we collectively decided to perform the procedure of selective thrombolytic therapy in the X-ray operating room. The angiography revealed the occlusion of the left anterior cerebral artery in the A_2 segment. The injection of Actilyse (2 mg) was administered distally to the thrombus. The microcatheter was retracted into the projection of occlusion. The injection of 2 mg of Actilyse into the thrombus was administered. The microcatheter was retracted proximally to the occlusion. The repeated angiography 5, 15 and 20 minutes later showed no changes in the right anterior cerebral artery (ACA) blood flow. The injection of Actilyse 14 mg proximally to the thrombus was administered within 40 minutes. The comparison angiography showed positive dynamics — the A_2 segment of the left ACA became passable.

On September 24, 2012 at 3:00 p.m., the patient had regressed right sided hemiplegia with the growing strength in the right extremities of up to 2 points, but preserved sensorimotor dysphasia with a predominant motor component. On September 25, 2012 at 7 a.m. we noted the regressed speech abnormality and increased muscle strength in the right extremities of up to 4 points with sensory impairments (NIH scale — 3 points).

The check CT scan of the brain has not identified any focal or massive lesion.

Cardiologist consultation: ischemic heart disease (IHD). Exertional angina, functional class II—III. Hypertensive heart disease stage III, the risk 4 chronic heart failure functional class II according to NYHA. Taking into the account the high functional class of angina, coronary angiography was recommended.

The check angiography of the brachiocephalic trunk (BT) was carried out: subclavian arteries — passable. RIGHT: the vertebral artery (VA) — 45% ostial stenosis; the common carotid artery (CCA), the external carotid artery (ECA) — passable; the internal carotid artery (ICA) — 40% ostial stenosis. LEFT: the VA was tortuous in segment VI, ostial stenosis 40%; CCA, ECA, ICA — passable.

Coronary angiography: right-dominant coronary circulation. The trunk — passable. The left anterior descending artery (LAD): extended subocclusion in the middle part, the distal bloodstream was antegrade and poor. The diagonal branch: underdeveloped, passable. The circumflex artery: 30% stenosis in the proximal part starting from the ostium. The obtuse marginal branch had irregular contours. The right coronary artery and left ventricular branch had irregular contours. Posterior descending artery had 70% stenosis in the middle part.

Echocardiographic study: left ventricular diastolic dysfunction, type 1. Myocardial hypertrophy of the left ventricle (LV). Calcification of the mitral valve and the aortic valve (AV). Atherosclerosis of the aorta. Ejection fraction — greater than 55%.

Laboratory tests showed no substantial changes, cholesterol — 4.2 mmol/L.

Consultation of leading experts from cardio- and neurocenters: the BT was not indicated for surgery; percutaneous coronary angioplasty of the left anterior descending artery had been recommended, which was performed on October 4, 2012.

At discharge, the patient was recommended to continue taking Clopidogrel 75 mg/day and Crestor 10 mg/day with the aim of secondary prevention, and a diet with restriction of salt, fats, and carbohydrates.

On May 23, 2013 at 7:30 p.m. the weakness in the left extremities acutely developed in the patient, and at 8:00 p.m. he was admitted to the primary vascular department in Goryachy Klyuch. The psychosomatic neurological status upon admission to the department: mild paresis of mimic muscles on the left side, mild dysarthria. Left-sided hemiparesis with decreased strength in the left extremities of up to 2 points. Left-sided hemihypesthesia (NIH scale score 7). The CT scan of the brain: the signs of the ischemic

stroke in the right middle cerebral artery (MCA) system (17x12x23 mm in the right parietal lobe). At 9:00 p.m., the systemic thrombolytic therapy with Actilyse 75 mg (patient weight — 72 kg) was initiated. Against the background of the systemic thrombolytic therapy (TLT) we noted regressing neurological deficit as an increase in muscle strength of up to 4 points, but at 11:30 p.m. the muscle strength reduced in the left hand to 1 point and in the left leg to 3 points.

The triplex scanning of neck arteries revealed 90% stenosis of the right ICA. The patient was reported through the air ambulance, and the transfer to RVC was recommended. The patient was admitted to RVC on May 24, 2013 at 1:10 a.m. The neurological status upon admission: mild left-sided hemiparesis grade 4.

The CT of the brain: the area of ischemia in the right temporal region of 29x25x7 mm (Fig. 1).

The superselective angiography of the neck arteries: the subclavian artery — passable. Right: the VA — 30% osteal stenosis; CCA, ECA — passable; ICA — critical osteal stenosis. Intracranial bloodstream: MCA is being filled antegradely and poorly through the communicating arteries of the Willis' circle, ACA is being filled through communicating artery from the left ICA. Left: the tortuous VA in segment VI, 40% osteal stenosis, CCA, ECA, ICA — passable (Fig. 2).

The coagulogram performed on May 24, 2013 at 3:01 a.m.: international normalized ratio — no coagulation, prothrombin time — no coagulation, activated partial thromboplastin time — 81.9 seconds, fibrinogen — 0.87 g/L.

The consultation of leading experts: taking into account the almost complete regression of neurological deficit (NIH grade 2), the systemic TLT with Actilyse on May 23, 2013 at 9:00 p.m., the size of the ischemic area (29x25x7 mm) on the CT scan of the brain, changes in coagulogram, the need for a combined antiplatelet therapy and the high risk of intra- and postoperative complications, we denied performing emergency transluminal balloon angioplasty.

Magnetic resonance imaging of the brain (May 28, 2013) revealed ischemic lesions in the right frontal, parietal, temporal, occipital region (Fig. 3, 4).

The neurological status showed complete regression of neurological deficit.

The patient underwent transluminal balloon angioplasty of the right ICA with implantation of Wallstent 7,0x40 mm on May 31, 2013 (Fig. 5).

RESULTS AND CONCLUSION

Development and introduction of common principles of management for patients with the stroke should help optimize the diagnostic approach and the choice of therapeutic measures to ensure the best outcome. When the stroke is suspected, the major principles of aid organization should be:

- Emergency transportation of patients by ambulance crews not only with severe symptoms of stroke, but also with the primary manifestations;
- Emergency differentiated medical care at the vascular departments with specialized resuscitation and intensive care unit for patients with disorders of cerebral circulation, which are located on the base of general hospitals with intensive care and neurosurgical departments, and a modern radiodiagnosis unit (CT and MRI).

Thus, the delivery of differentiated emergency medical care, new technologies of reperfusion therapy in the early hours of the ischemic stroke, which are being actively conducted under a special program for all medical institutions of the Krasnodar Territory, contribute to the improvement of targets of morbidity and mortality in the region as a whole and in this case in particular, but also improve an outcome, determining a good recovery of neurological functions disturbed.

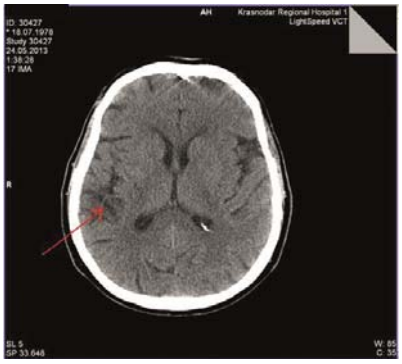

Fig. 1. Computed tomography of the brain

Fig. 2. Superselective angiography of the brachiocephalic trunk

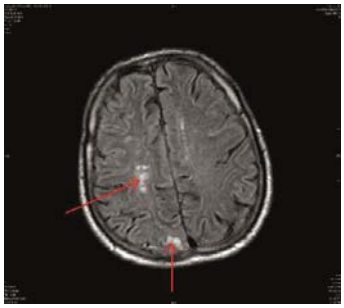

Fig. 3. Magnetic resonance imaging of the brain. Mode DWI

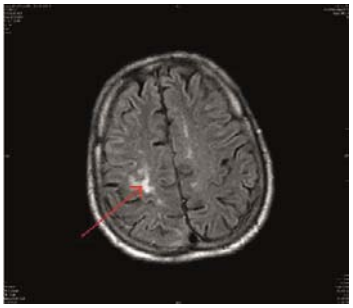

Fig. 4. Magnetic resonance imaging of the brain. Mode DWI

Fig. 5. Angiography of the bronchiocephalic artery

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