

MODERN STANDARDS AND THEIR CONCEPTS IN TRANSIENT DISORDERS OF CEREBRAL CIRCULATION

Mukhammadjonov Ismoiljon

Assistant of the Department of Pathology and Forensic Medicine,
Central Asian Medical University.

<https://doi.org/10.5281/zenodo.15115964>

Abstract. *Acute cerebrovascular accident is one of the most common and dangerous diseases in the world today, causing a high level of disability and mortality. Modern standards for early diagnosis, effective treatment and rehabilitation of this disease are of great importance.*

One of the most important principles currently used in the treatment of acute cerebrovascular accident is the concept of “time is brain”, that is, providing assistance to the patient as soon as possible is one of the main tasks. Innovative methods such as thrombolytic therapy, neuroprotection and neurovisualization help to reduce the consequences of the disease.

Also, approaches are being developed to improve the quality of life of patients through rehabilitation and preventive measures. This article will comprehensively cover modern approaches to the diagnosis and treatment of acute cerebrovascular accident, as well as effective methods for stroke prevention, including antithrombotic therapy, blood pressure control and the importance of forming a healthy lifestyle.

Keywords: *Cerebral circulation, stroke, modern standards, neurovisualization, thrombolytic therapy, neuroprotection, rehabilitation, prevention.*

СОВРЕМЕННЫЕ СТАНДАРТЫ И ИХ КОНЦЕПЦИИ ПРИ ТРАНЗИТОРНЫХ НАРУШЕНИЯХ МОЗГОВОГО КРОВООБРАЩЕНИЯ

Аннотация. *Острое нарушение мозгового кровообращения является одним из наиболее распространенных и опасных заболеваний в современном мире, вызывающим высокий уровень инвалидности и смертности. Современные стандарты важны для ранней диагностики, эффективного лечения и реабилитации этого заболевания. Одним из важнейших принципов, используемых в настоящее время при лечении острых нарушений мозгового кровообращения, является концепция «время-мозг», означающая, что одной из главных задач является скорейшая помощь больному. Инновационные методы, такие как тромболитическая терапия, нейропротекция и нейровизуализация, помогают уменьшить последствия заболевания. Также разрабатываются подходы, направленные на улучшение качества жизни пациентов посредством реабилитационно-профилактических мероприятий. В статье широко освещены современные подходы к диагностике и лечению острых нарушений мозгового кровообращения, а также эффективные методы*

профилактики инсульта, в том числе антитромботическая терапия, важность контроля артериального давления и формирования здорового образа жизни.

Ключевые слова: *Цереброваскулярное кровообращение, инсульт, современные стандарты, нейровизуализация, тромболитическая терапия, нейропротекция, реабилитация, профилактика.*

Introduction

Acute Cerebral Vascular Disorders Acute cerebral vascular disorders, or stroke, are one of the most urgent medical and social problems in the world today. This disease is one of the main causes of death and disability among cardiovascular pathologies. According to the World Health Organization (WHO), millions of people suffer strokes every year, and most of them do not fully recover. In recent years, modern approaches to the diagnosis and treatment of acute cerebral vascular disorders have been developed, increasing the possibility of reducing the consequences of this pathology. In particular, the development of neurovisualization technologies, the widespread use of thrombolytic therapy, and the introduction of neuroprotective methods allow for effective medical care in the early stages of stroke. At the same time, the issues of rehabilitation and disease prevention after acute cerebral vascular disorders are also important.

Preventive measures such as the formation of a healthy lifestyle, control of blood pressure and cholesterol levels, and antithrombotic therapy help to significantly reduce the risk of developing a stroke. This work discusses modern diagnostic and treatment standards for acute cerebrovascular accidents, as well as effective methods of preventing the disease. Innovative approaches to the prevention and treatment of this pathology based on modern concepts are analyzed.

Literature review and method

Acute cerebrovascular accident is a brain injury caused by vascular changes, characterized by focal signs, general brain signs, meningeal signs, or a combination of these signs. Depending on how long the neurological deficits persist in the patient, transient cerebrovascular accident and stroke are distinguished. Patients with frequent emotional stress, low mobility, smoking, high body weight, diabetes, arterial hypertension, dyslipoproteinemia, and a hereditary predisposition to cardiovascular diseases are considered to be patients with a high risk of this disease. Acute cerebrovascular accident of the ischemic type occurs as a result of the inability of the brain to meet its need for oxygen and energy substrates, blood flow to the brain, and a sudden deterioration in cerebral circulation. The hemorrhagic type of acute cerebrovascular accident is characterized by bleeding into the brain tissue, ventricles, and under the meninges as a result of a violation of the integrity of the blood vessel wall.

As a result of studying the causes of cerebrovascular diseases, it was found that there are several risk factors: the age of the patient plays an important role in the development of the disease, and the risk of developing the disease increases with age. Although the disease mainly affects the elderly and the elderly, the risk of developing cerebrovascular diseases doubles every 10 years as people age, for example, in relation to the population, it is 1:30,000 in 0-14 years, 1:5,000 in 35-44 years, 1:100 in 65-74 years, 1:50 in 75-84 years, and 1:30 in 84 years and older. It should be noted that in the elderly and the elderly, disorders of the cerebral vascular system and lipid metabolism are interconnected with the development of atherosclerosis, and the development of atherosclerosis, in turn, leads to hypertension. Heredity - hereditary predisposition plays a major role in the development of heart disease and atherosclerosis.

Atherosclerosis is an important cause of death and disability in developed countries of the world. In ischemia of all organs in the body, especially in diseases of the central nervous system and cardiovascular system, damage to large and medium-caliber arterial blood vessels plays a key role. This is due to the proliferation of the inner layer (intima) of arterial blood vessels, consisting of smooth muscle cells, and the deposition of lipids in this area, which leads to narrowing of the blood vessel lumen. Atherosclerotic plaque develops in the primary damaged area of the blood vessel. The clinical picture of atherosclerosis depends on which organ blood vessels are damaged and its nature. For example: coronary atherosclerosis can cause angina or myocardial infarction, damage to the cerebral arteries can cause a stroke. Atherosclerosis of the renal arteries is an important factor in the development of arterial hypertension, while it is itself a risk factor for atherosclerosis. Atherosclerosis has a wave-like course. Atherosclerotic plaques can develop over several years or several decades. Atherosclerosis affects the arteries in different ways, and usually atherosclerotic plaques limit the speed of blood flow by causing stenosis and occlusion in the vascular space, or they can also cause vascular aneurysms by expanding the vascular space. This is typical for the aorta. Because here, rupture or, if not, expansion of the aneurysm is more common than stenosis and occlusion.

Acute cerebral circulation disorders are a life-threatening pathological condition, and their early diagnosis and differentiation are of great importance in reducing the consequences of the disease. In modern medicine, advanced imaging methods, laboratory biomarkers, and clinical scoring systems are used to diagnose acute cerebral circulation disorders. These diagnostic methods help to distinguish stroke into ischemic or hemorrhagic forms, determine the affected area, and select effective treatment methods.

Clinical Assessment and Stroke Scoring Systems

The FAST test and other clinical assessment methods are used to diagnose stroke at an early stage. The FAST test consists of the following:

- Face (face) - drooping of the corners of the mouth or facial asymmetry.
- Arms (arms) - inability to hold both arms in the same position.
- Speech (speech) - the patient cannot pronounce words correctly or speaks incomprehensibly.
- Time (time) - the need to immediately consult a doctor when symptoms appear.

In addition, the NIHSS (National Institutes of Health Stroke Scale) assessment system is used to determine the severity of stroke. This scale assesses the patient's general neurological condition on a 42-point scale.

Neuroimaging methods are used to confirm the diagnosis of acute cerebral circulation disorders and determine the form of the disease.

(CT)

CT is a quick and effective method for detecting bleeding or ischemic changes in the brain.

CT is very sensitive in confirming hemorrhagic stroke and clearly shows blood clots in the brain parenchyma. Although CT has limitations in detecting ischemic stroke in the early hours, it is used to exclude bleeding before thrombolytic therapy.

Angiography

CT angiography is used to detect narrowing of the cerebral arteries or acute thrombosis.

This method helps to determine the occlusion of large arteries and assess the need for mechanical thrombectomy.

Magnetic resonance imaging (MRI)

MRI is effective in detecting ischemic stroke at an early stage. Diffusion-weighted MRI (DWI) clearly shows the areas of brain cells that are deprived of oxygen. Perfusion MRI (PWI) helps to assess areas of impaired blood circulation.

Transcranial Doppler Ultrasound (TCD)

TCD determines the blood flow velocity and degree of stenosis in the cerebral arteries.

This method is important in detecting arterial emboli and in assessing the risk of stroke.

Biomarker Analysis

One of the auxiliary laboratory methods in the diagnosis of acute cerebrovascular accident is the study of blood biomarkers. Biomarkers such as S-100 beta, neuron-specific enolase (NSE) and D-dimer are associated with the development of stroke, and their increased levels are used as additional evidence for the diagnosis of stroke.

Modern methods of diagnosing acute cerebrovascular accident help to detect the disease early, differentiate its type and choose an effective treatment strategy.

Neuroimaging technologies, laboratory tests and clinical scoring systems can improve the quality of life of patients and reduce the consequences of stroke.

Treatment of acute cerebrovascular accident requires an urgent and comprehensive approach. The treatment process differs depending on the type of disease: in ischemic stroke, the main focus is on restoring blood circulation, while in hemorrhagic stroke, stopping bleeding and reducing intracranial pressure are of great importance.

The patient is urgently transported to a specialized stroke center and initial stabilization measures are carried out. This includes:

- Maintaining an open airway and administering oxygen.
- Monitoring blood pressure and, if necessary, correcting it with medication.
- Monitoring heart and respiratory function.
- Controlling blood sugar levels and preventing hyperglycemia.
- The main goal in ischemic stroke is to open the blocked vessel and protect brain tissue from damage.
- Alteplase (rtPA) – when administered within 3-4.5 hours, dissolves the clot and restores blood flow.
- Tenecteplase – has a longer duration of action and is sometimes used as an alternative to alteplase.
- Thrombolytic therapy is only used in ischemic stroke and is contraindicated in hemorrhagic stroke.

Mechanical Thrombectomy

Mechanical thrombectomy is performed when large vessel thrombosis (M1 segment, internal carotid artery) is observed. This method removes the thrombus using a catheter. The operation can be performed within 6-24 hours after the onset of the stroke.

Rehabilitation after acute cerebral circulation disorders

Rehabilitation for patients who have suffered acute cerebral circulation disorders is aimed at ensuring long-term recovery, improving the quality of life and preventing complications. This process is carried out depending on the severity of the disease, the affected brain areas and the general condition of the patient.

Early Rehabilitation

Depending on the patient's condition, rehabilitation begins as early as possible after the stroke. At the initial stage, initial movement exercises are performed by a physiotherapist, rehabilitation specialist and neurologist in intensive care. This helps to prevent muscle atrophy and reduce the risk of thrombosis.

Restoration of Motor Activity

As a result of a stroke, patients experience paralysis, muscle weakness and balance disorders. To restore motor functions:

- Passive and active exercises
- Reflex therapy
- Mechanical and robotic rehabilitation technologies
- Electromyostimulation and water procedures

Restore Speech and Language Abilities

In case of speech disorders, special training is carried out by a speech therapist.

Techniques aimed at stimulating speech, improving hearing and communication skills are used.

Restore Cognitive Functions

To improve patients' memory, attention and thinking abilities:

- Logical and strategic games
- Book reading and word memorization exercises
- Neuroprotective drugs and means that improve cerebral blood circulation

Restore Daily Life Activities

The patient's independent mobility and restoration of daily life activities are an important part of rehabilitation. Occupational therapy, special training exercises and programs for returning to social activity are developed.

Psychological Support

To prevent depression and mood disorders, psychotherapy, group exercises, and communication with family members are recommended.

Home Rehabilitation

Rehabilitation should be continued after the patient is discharged from the hospital.

Physical exercise, speech development, and social involvement will speed up the recovery process.

Measures to prevent acute cerebral circulation disorders

To prevent acute cerebral circulation disorders, it is necessary to implement comprehensive preventive measures. These measures are aimed at reducing the risk factors that cause the development of the disease and include lifestyle changes, control of chronic diseases, and medical prevention.

Controlling Arterial Hypertension

Ensuring stable blood pressure is one of the main factors in reducing the risk of stroke.

Patients with arterial hypertension should maintain blood pressure below 140/90 mmHg.

It is also important to reduce salt intake, engage in regular physical activity, and take medications prescribed by your doctor.

Cardiovascular Disease Management

One of the main causes of the development of CAD is heart disease, in particular atrial fibrillation and heart failure. Early detection of these diseases and appropriate treatment significantly reduces the risk of stroke. Antiplatelet and anticoagulant therapy should also be used to prevent blood clots.

Follow a Healthy Eating Plan

A healthy diet plays an important role in preventing cardiovascular disease and CVD. It is recommended to include the following in your diet:

- Fruits and vegetables
- Whole grains
- Healthy fats (olive oil, nuts)
- Lean protein sources (fish, poultry)

It is necessary to reduce the consumption of products high in fat, salt and sugar.

Increase Physical Activity

Regular physical activity plays an important role in normalizing blood pressure, strengthening the cardiovascular system and controlling weight. It is necessary to engage in at least 150 minutes of moderate physical activity per week. Walking, running, swimming and cycling are effective in preventing stroke.

Quitting Bad Habits

Tobacco products narrow blood vessels and increase the risk of acute cerebrovascular accidents. Quitting smoking can help improve blood circulation and reduce the risk of stroke.

Excessive alcohol consumption can also lead to heart rhythm disorders and arterial hypertension, so it is necessary to limit it.

Controlling Diabetes and Metabolic Syndrome

Diabetes and metabolic syndrome are among the main risk factors for developing stroke.

Controlling blood glucose levels, following a proper diet, and taking medications prescribed by a doctor can help diabetic patients reduce their risk of developing acute cerebrovascular accidents.

Managing Stress and Getting Enough Sleep

Severe stress increases blood pressure, putting an overload on the cardiovascular system.

Meditation, yoga, breathing exercises, and other relaxation techniques can be used to reduce stress. Getting 7-8 hours of quality sleep a day supports the body's recovery processes.

Getting Regular Medical Checkups

To reduce the risk of acute cerebrovascular accidents, it is necessary to regularly monitor blood pressure, sugar, and cholesterol levels. Elderly people and patients at high risk of stroke should be examined by a cardiologist and neurologist at least 1-2 times a year. It is also important to assess the condition of the cerebral blood vessels using Doppler ultrasound.

Compliance with these measures to prevent acute cerebral circulation disorders reduces the risk of stroke and helps prevent cardiovascular diseases.

Conclusion

Acute cerebrovascular accident is one of the most severe pathologies of the cardiovascular system, which has a significant impact on the quality of life and life expectancy of patients. The fact that this disease is associated with a high level of mortality and disability requires its effective prevention, early diagnosis and the use of modern treatment methods.

Measures to prevent acute cerebrovascular accident are based on an integrated approach and include lifestyle changes, control of chronic diseases and regular medical examinations.

Maintaining a stable blood pressure, controlling cardiovascular diseases, preventing diabetes and metabolic syndrome help significantly reduce the risk of stroke. Factors such as proper nutrition, physical activity, giving up bad habits and stress management also play a major role in ensuring the stability of cerebral circulation. Early detection of acute cerebrovascular accident and the use of modern diagnostic methods are important in reducing the severe consequences of the disease. Therefore, individuals at high risk should be regularly monitored by a cardiologist, neurologist, and therapist. Blood tests, ultrasound Dopplerography, MRI, and other instrumental examinations can detect cerebral circulation disorders at an early stage.

Treatment methods are determined based on the individual characteristics of each patient.

Conservative therapy, regulation of blood pressure and blood clotting properties with medications, and the use of neuroprotectors and anticoagulants can help mitigate the consequences of a stroke. Surgical procedures can also be used if necessary.

The rehabilitation process after acute cerebral circulation disorders is a long-term stage aimed at ensuring the patient's comprehensive recovery. Physiotherapy, rehabilitation exercises, speech therapy, and psychological support are important for improving the quality of life after the disease. In general, the severe consequences of the disease can be reduced through prevention, early diagnosis, and effective treatment of acute cerebral circulation disorders.

To do this, everyone should pay attention to their health, undergo regular medical examinations and adhere to a healthy lifestyle. By adhering to preventive measures, the risk of stroke can be significantly reduced and a person's life can be extended.

REFERENCES

1. Ministry of Health of the Republic of Uzbekistan, "Clinical protocols for acute disorders of cerebral circulation", Tashkent, 2022.
2. Gusev E.I., Skvortsova V.I. "Stroke: diagnosis and treatment", Moscow, GEOTAR-Media, 2020.
3. World Health Organization (WHO), "Global burden of stroke and strategies for prevention", Geneva, 2021.
4. American Heart Association (AHA) & American Stroke Association (ASA), "Guidelines for the early management of patients with acute ischemic stroke", Stroke Journal, 2019.
5. Ministry of Health of the Republic of Uzbekistan, "National strategy for the prevention of cardiovascular diseases", Tashkent, 2021.
6. Qodirov Sh., Mahmudov A. "Acute disorders of cerebral circulation: modern methods of diagnosis and treatment", Tashkent Medical Journal, No. 3, 2022.
7. Adams H.P., Del Zoppo G., Alberts M.J. "Guidelines for the management of patients with acute ischemic stroke", Circulation, 2020.