INTERNATIONAL JOURNAL OF
INTEGRATIVE AND
MODERN MEDICINE

Medical Support of the Rehabilitation Process in Acute Cerebral Circulatory Disorders

Yakheev Mehriddin Sabriddinovich
Bukhoro davlat Tibbet institutes, yahyoyev.mehriddin@bsmi.uz

Summary: Medical support of the rehabilitation process is one of the basic tasks of any rehabilitation. Effective rehabilitation is impossible without drugs, but from this point of view, to increase the effectiveness of the rehabilitation process, all participants of the multidisciplinary rehabilitation team are involved, who are designed to solve issues not only of drug selection, but also of ensuring compliance and commitment for a long period of time when rehabilitation in the hospital is completed.

Keywords: Stroke, rehabilitation, treatment

Acute cerebral circulatory disorders (OCD) are one of the most serious causes of disability and mortality. Stroke ranks 2nd in the frequency of deaths from diseases of the circulatory system in the Russian Federation. Disability after a stroke is high and reaches 3.2 per 10,000 people, ranking 1st among all causes of primary disability, with only 20% of survivors able to return to work [7, 8, 24]. International experience shows that success in the prevention, treatment and recovery of stroke patients is possible with a systematic approach using a coordinated set of measures, the main of which are the introduction of effective preventive programs and improvement of the system of medical care for stroke. The most important part of medical care for cerebral circulation disorders is rehabilitation [7, 9]. The aim of rehabilitation is to restore independence and ability to work, improve the quality of life of the patient, as well as, as far as possible, reduce the limitations of his activity, increase reserves of participation in everyday life, promote the beneficial effects of the environment and neutralize risk factors [7, 14]. The treatment of cancer involves the use of a whole range of medical methods, including drug support, at all stages of the rehabilitation process, starting from the acute period of the disease, when the rehabilitation potential of the patient is largely determined. Given the integral nature of the rehabilitation process and its multidisciplinary nature, drug support for rehabilitation includes the positions of basic therapy, specific treatment, secondary prevention, treatment of acute stroke complications and correction of post-stroke conditions. Of course, the drug component of the rehabilitation process is one of the most important, but still parts, and cannot ensure complete success in restoring structure, function, activity, and participation without physical treatment methods, pedagogical, professional, and social measures. I would also like to remind you that drug therapy, the use of various drugs from the point of view of the International Classification of Functioning (ICF) is a manifestation of environmental influences. Thus, medications are environmental factors, and the task of a rehabilitologist is to ensure that these factors support the rehabilitation process [9]. In the ICF, pharmacotherapy is encrypted in second–level domains - "e110. Products or substances for personal consumption" and the domain of the third level – "e1101. Medicinal substances". The role of drugs, as well as all environmental factors, is assessed on a scale from -4 to +4 points. That is, a score of "-4" indicates a negative effect of drug therapy on the functioning of the patient. A score of "0" indicates that drugs have no effect on the course of the rehabilitation process, and a score of "+4" indicates that drugs are accomplices of the rehabilitation process. From the standpoint of rehabilitation, medications can have different effects. For example, warfarin, when used correctly, can significantly reduce the risk of stroke in patients with atrial fibrillation, but if overdosed or taken irregularly, it can cause life–threatening conditions. If the score is in the "–" or "0" category, the rehabilitation team adds this domain to the rehabilitation diagnosis. The nature of rehabilitation interventions can be aimed not only at individualized selection of medications according to instructions or recommendations, but also at

working with the patient and his relatives [9]. Ways to increase adherence to therapy during rehabilitation: • Informing the patient about the prescribed therapy, both about pleiotropic effects and adverse events. • Simplification or modification of the therapy regimen. • Developing the skill and habit of taking medications. • The use of diaries and special programs for a computer or smartphone. • Finding motivation to receive therapy. Thus, in rehabilitation with the domain "e1101. Medicinal substances" can be used not only by a doctor, but also by a psychologist or occupational therapist. Effective basic therapy of stroke, aimed at ensuring an optimal level of functioning of physiological systems for the prevention and treatment of respiratory disorders, relief of central hemodynamic disorders with monitoring and correction of levels of oxygenation, blood pressure (BP), cardiac activity, and basic parameters of homeostasis, is the basis for the formation of the rehabilitation potential of the patient. Medical interventions for basic therapy include hemodynamic correction (with mandatory consideration of current recommendations for the management of patients with cancer). Antihypertensive agents (labetalol or nicardipine) can be used to correct arterial hypertension. With diastolic hypertension exceeding 140 mmHg, careful intravenous administration of sodium nitroprusside is possible (contraindication is intracranial hypertension). Vasopressors may be prescribed for systemic arterial hypotension. The choice of the drug is individual, but in any case, such therapy requires constant monitoring of blood pressure and electrocardiography [7, 20]. It is important to ensure a normal balance of fluids and electrolytes. This is achieved by correcting hypovolemia, taking into account the daily fluid requirement in the form of infusion or enterally. Correction of cardiac arrhythmias affecting stroke volume and reducing tolerance to infusion therapy is carried out on the basis of appropriate clinical recommendations. Correction of blood glucose levels in hypoglycemia is carried out by intravenous administration of 40% glucose solution 20-40 ml, if necessary by infusion of 5% glucose solution under glycemic control.

Hyperglycemia above 11 mmol/l is corrected by intramuscular injections of simple insulin in an individual regimen of 4-6 units 4-6 times a day until normoglycemia is reached. Patients with insulin-dependent diabetes mellitus who received prolonged forms of insulin are replaced with simple insulin. With hyperthermia above 38 ° C, antipyretics (paracetamol) are prescribed in addition to physical methods of lowering the temperature. Specific therapy, like basic therapy, largely determines the rehabilitation potential of a patient undergoing CANCER. Specific therapy for ischemic stroke (IS) includes reperfusion therapy using thrombolytic agents (currently, recombinant tissue plasminogen activator alteplase is used for cerebral thrombolysis), as well as antiplatelet therapy (acetylsalicylic acid – ASA at a dose of 325 mg within 24-48 hours from the onset of stroke) [7, 16, 20, 28]. Currently, no specific drug therapy for hemorrhagic stroke has been developed. In the most acute and acute period of stroke, it is possible to develop cerebral edema, which is controlled by hyperosmolar drugs (subject to certain conditions: avoid hypovolemia, do not use with hyperosmolarity or hypotension, as well as renal and decompensated heart failure). Hyperosmolar drugs are mannitol (mannitol), 3-10% sodium chloride solution, and 10% glycerin [7, 20]. Sedatives in the acute period of the disease may be necessary to provide intensive care for the patient, including to provide effective respiratory support. Modern requirements for sedatives: they should have a short effect and should not cause serious hemodynamic disorders. Possible combinations of sedatives: midazolam (dormicum) or diazepam (relanium) + ketamine (ketalar, ketamine hydrochloride), droperidol + ketamine (ketalar, ketamine hydrochloride), barbiturates (sodium thiopental or hexenal) + ketamine (ketalar, ketamine hydrochloride), trimeperidine (promedol) + midazolam (dormicum), propofol (diprivan) + fentanyl. A complex issue is the pharmacological regulation of cerebral blood flow, in order to reduce the brain's needs for O2 and nutrients with a corresponding decrease in blood flow and blood supply – barbiturates, propofol (diprivan), "despair therapy" – barbituric coma [7, 20]. Drug therapy and prevention of stroke complications are extremely important, since such complications are life-threatening for the patient and can negate all rehabilitation efforts. Prevention of stroke complications should be started as early as possible, it includes a wide range of non-drug methods, as for drug support. – These include treatment of pneumonia or urinary tract infection (antibiotic therapy in accordance with the sensitivity of the pathogen), prevention of thromboembolic complications, primarily pulmonary embolism and deep vein thrombosis of the lower extremities (the use of low

doses of heparin or low molecular weight heparins), correction of psychomotor agitation (sedatives and antipsychotics), standard anticonvulsant therapy for patients with active epilepsy, stroke survivors, comatose patients, in whom electroencephalography (EEG) monitoring reveals epileptiform activity, in stroke patients who have had repeated seizures (the goal of therapy is not to stop seizures, but to completely suppress epileptiform activity on the EEG). Antibacterial drugs and anticonvulsants are not used for preventive purposes (before complications develop) [7, 20]. Neuroprotection may play a major role in the rehabilitation process. Neurocytoprotection is any strategy (or combination of strategies) that prevents or slows down brain tissue damage and promotes morphological, metabolic, and functional recovery of neurons and their environment. Of course, of all neuroprotective strategies, drug-based approaches are the most developed. The main directions of neuroprotection are related to the restoration of cells of the ischemic penumbra and the stimulation of reparative processes. Recently, the results of studies have been published in which a number of pharmacological agents have shown encouraging results in restoring movement in the upper limb and restoring cognitive functions. Work on studying the effects of neuroprotectors in cancer continues. There are serious reasons to believe that it is the rehabilitation approach that will allow this area to obtain high-class and evidence-based results in clinical trials of drugs [1]. In case of cancer, magnesium sulfate (a blocker of excitatory amino acids, a blocker of calcium channels), thioctic (a-lipoic) acid (performs the functions of a coenzyme in mitochondria, under pathological conditions has the property of "trapping" free radicals), glycine (an amino acid, a central inhibitory neurotransmitter), Semax (a synthetic analogue of the fragment adrenocorticotropic hormone, regulatory peptide), cerebrolysin (a complex of peptides derived from the pig brain, some of which have structural and functional similarities with neurotrophic factors), Cortexin (a complex of polypeptides and neurotransmitters isolated from the brain of cattle), citicoline (a choline donor for the synthesis of acetylcholine, an essential metabolite for the synthesis of membrane phospholipids), Actovegin (a highly purified hemodialysate of calves' blood – activates enzymes of oxidative phosphorylation, accelerates the breakdown of products of anaerobic glycolysis, promotes glucose utilization), choline alfoscerate (participates in the synthesis of acetylcholine, has a positive effect on neurotransmission, synthesis of membrane phospholipid), mexidol (ethylmethylhydroxypyridine succinate, an inhibitor of free radical processes and a membrane protector), cytoflavin (inosine + nicotinamide + riboflavin + succinic acid) – a drug whose pharmacological effects are due to the complex effect of the components included in the drug (succinic acid, riboflavin, nicotinamide, inosine) [3, 6]. Currently, a new direction for the use of neuroprotectors is being considered – stimulation of neuroplasticity. It is assumed that if neuroprotective and physical therapy are combined, the optimal effect can be achieved. Amantadines (drugs that stimulate the release of dopamine in the synaptic cleft), levodopa (dopamine precursors), piribedil (dopamine receptor agonists), fluvoxamine and escitalopram (Sigma-1 receptor agonists, selective serotonin reuptake inhibitors), Cerebrolysin, Citicoline should be considered as means of stimulating neuroplasticity in focal brain damage. , Actovegin, Semax and Selank [2, 6]. A methodology for using drugs to stimulate neuroplasticity is currently being developed. Medicines are undergoing clinical trials. This area is considered as one of the most promising in rehabilitation. Drugs that contribute to the depletion of neurons or cause theft syndrome are not recommended for use in the acute and acute period of AI. The use of such drugs potentially reduces the rehabilitation potential and worsens the prognosis. Such drugs include nootropics and vascular agents (piracetam, vinpocetine, euphyllin, pentoxifylline, nicergoline). Secondary prevention It is difficult to overestimate the importance of effective secondary prevention in the rehabilitation process. Any efforts to restore the patient may be in vain in her absence. In patients who have had an AI or transient ischemic attack (TIA), the risk of recurrent strokes is increased by almost 10 times and amounts to about 25-30%. The main directions of secondary prevention of AI include both non-medicinal methods (correction of risk factors, lifestyle modification) and drug therapy (antihypertensive, antithrombotic drugs, statins) and surgical treatment methods [20]. Different classes of antihypertensive agents can be used in antihypertensive therapy, taking into account individual characteristics; it is recommended to include diuretics, a combination of a diuretic and an angiotensin converting enzyme inhibitor, angiotensin II receptor antagonists (eprosartan) in therapy [7, 20]. Antiplatelet medications are recommended for non-cardioembolic

stroke (atherothrombotic, lacunar, and stroke with an unknown cause), and indirect anticoagulants (class I, level A) are recommended for cardioembolic stroke. If indirect anticoagulants are not possible or contraindicated in cardioembolic stroke, then antiplatelet drugs are recommended. Antiplatelet agents for the prevention of AI include: ASA (from 75 to 325 mg /day); clopidogrel (75 mg /day); a combination of clopidogrel with ASA [indicated for a patient who has undergone not only TIA or AI, but also coronary artery stenting, small-focal myocardial infarction (without Q wave formation) or has unstable angina for at least 9 months]; dipyridamole (200 mg of delayed release, administered 2 times a day). Indirect anticoagulants are recommended for patients with atrial fibrillation, an artificial heart valve, or another cause of cardioembolic stroke: warfarin (prescribed at 2.5–10 mg / day with the achievement and constant maintenance of the international normalized ratio – INR at 2-3, used for various causes of cardioembolic stroke; requires constant laboratory monitoring of INR); dabigatran (110 or 150 mg / day in 2 doses); rivaroxaban (20 or 15 mg with creatinine clearance 30-50 ml / min 1 time per day); apixaban (5 or 2.5 mg 2 times per day). New oral anticoagulants do not require routine INR monitoring [1, 20]. Among the groups of drugs that normalize the blood lipid spectrum, statins have proven effectiveness for the prevention of AI. Statins are recommended for patients who have suffered from noncardioembolic IIA or TIA and have signs of cerebral atherosclerosis [7, 20]. Multivitamins are used for hyperhomocysteinemia (daily use of 2.5 mg of folic acid, 50 mg of vitamin B6 and 1 mg of vitamin B12) [7, 11]. Significant obstacles to the rehabilitation of patients with cancer can be created by a low emotional background or a depressive episode that has developed. In the treatment of post-stroke depression, serotonin reuptake inhibitors are most often used. The success of the use of antidepressants is due, among other things, to an increase in the level of adherence to therapy [7]. An important aspect of rehabilitation is the prevention and treatment of post–stroke dementia, drug approaches involve the use of various drugs: Actovegin, Cerebrolysin, Citicoline, choline alfoscerate - for initial manifestations or for prevention; acatinol memantine, donepizil, rivastigmine, ipidacrine – for more obvious cognitive impairments. One of the common problems of functioning after a stroke is increased pyramidal muscle tone in the paretic limbs. Prolonged ignoring of this problem can lead to severe hypertension and contracture. The problem can be identified already at the first stage of rehabilitation, in the full sphere these difficulties unfold at the II and III stages. In mild tonus disorders, centrally acting muscle relaxants tizanidine (causes presynaptic a2 receptors to be stimulated, thereby releasing excitatory amino acids that stimulate N-methyl-D-aspartate receptors), tolperisone (the mechanism of action is not fully understood), flupertin (activates G-protein-bound neuronal K+-channels of internal rectification, causing hyperpolarization) and baclofen (stimulates GABA receptors). With moderate to severe spasticity, botulinum therapy is used. Botulinum toxin injections are given only to the affected muscles. The effectiveness of this manipulation lasts from 1 to several months. Botulinum therapy has a high level of safety and allows you to effectively combat the problem of spasticity. The mechanism of action of this rehabilitation technology is associated not only with the blockade of the mechanism of muscle contraction, but also with a decrease in afferentation. This allows not only to adjust muscle tone, but also to reduce pain in the affected limb [7, 10]. Pain is one of the significant factors that can seriously limit vital functions. In the presence of pain, it becomes one of the main tasks for the initial stage of rehabilitation. Pain is a physiological marker of injury and/or discomfort. Pain needs to be corrected when there is too much of it or if it is pathological in nature. So, acute and chronic pain are distinguished. For acute pain, nonsteroidal anti-inflammatory drugs, flupertin, are used in rehabilitation, and narcotic analgesics can be used for severe pain. Local anesthetics can also be used for acute pain. Local anesthetics are used as therapeutic blockades (intramuscular or paraneural) or as transdermal transport systems – patches. These methods are very effective because they allow for local targeted interventions. Chronic pain syndrome often leads to disability in patients, which is always pathological and is associated with the involvement of central pain mechanisms in the pathogenesis, which often leads to the separation of pain from the source of damage and irritation of nociceptors. Tricyclic antidepressants (amitriptyline), selective serotonin, norepinephrine and dopamine reuptake inhibitors (serotonin – sertraline and citalopram, serotonin and norepinephrine – duloxetine, triple–acting Venlafaxine, etc.) are used to treat chronic pain. These drugs can act on the central mechanisms of chronic pain, their effects in most cases are not related to the

action of for depression. That is, the analgesic effect is an independent mechanism of action of this group of drugs. The use of narcotic analgesics is mainly advisable for pain associated with cancer. In neuropathic pain syndrome, drugs from the group of anticonvulsants are used, such as carbomazepine, gabapentin and pregabalin. These drugs have a solid evidence base and are effective in the presence of pain associated with damage to nerve structures, but they are usually ineffective in nociceptive pain syndromes. Although they are also considered as remedies for the treatment of chronic pain syndrome. Drug support of the rehabilitation process is one of the basic tasks of any rehabilitation. Effective rehabilitation is impossible without drugs, but from this point of view, to increase the effectiveness of the rehabilitation process, all participants of the multidisciplinary rehabilitation team are involved, who are designed to solve issues not only of drug selection, but also of ensuring compliance and commitment for a long period of time when rehabilitation in the hospital is completed. Rehabilitation fills the concept of drug support with a higher meaning and opens up new opportunities for the effectiveness and safety of medicines.

Literatures:

1. Lopez A. D., Mathers C. D., Ezzati M., Jamison D. T., Murray C. J. Global and regional burden of disease and risk factors, 2001: Systematic analysis of population health data // Lancet. 2006; 367: 1747–1757.
2. Redon J., Olsen M. H., Cooper R. S. et al. Stroke mortality trends from 1990 to 2006 in 39 countries from Europe and Central Asia: implications for control of high blood pressure // Eur Heart J. 2011; 32: 1424–1431.
3. Фонякин А. В., Гераскина Л. А. Профилактика ишемического инсульта. Рекомендации по антитромботической терапии. Под ред. Суслиной З. А. М.: Има-Пресс, 2014.
4. Dhamoon M. S., Tai W., Boden-Albala B. et al. Risk of myocardial infarction or vascular death after first ischemic stroke // Stroke. 2007; 38: 1752–1758.
5. Furie K. L., Kasner S. E., Adams R. J. et al. Guidelines for prevention of stroke in patients with ischemic stroke or transient ischemic attack. AHA/ASA Guideline // Stroke. 2011; 42: 227–276.
6. Goldstein L. B., Bushnell Ch. D., Adams R. J. et al. Guidelines for the Primary Prevention of Stroke: A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association // Stroke. 2011. Vol. 42. P. 517–584.
7. Guidelines for Management of Ischaemic Stroke and Transient Ischaemic Attack. The European Stroke Organization (ESO), 2008.120 c. http://www.eso-stroke.org.
8. Jauch E. C., Saver J. L., Adams H. P. et al. Guidelines for the Early Management of Patients With Acute Ischemic Stroke // Stroke. 2013. Vol. 44. P. 870–947.
9. Kernan W. et al. Guidelines for the prevention of stroke in patients with stroke and transient ischemic attack: a guideline for healthcare professionals from the American Heart Association/American Stroke Association // Stroke. 2014; 45: 2160–2236.
10. Intercollegiate Stroke Working Party. National clinical guideline for stroke, 4 th edition. London: Royal College of Physicians, 2012.
11. Кадыков А. С., Черникова Л. А., Шахпаронова В. Н. Реабилитация неврологических больных. М.: МЕДпресс-информ; 2008. 560 с.
12. Диагностика и коррекция нарушений липидного обмена с целью профилактики и лечения атеросклероза. Российские рекомендации. V пересмотр. М., 2012. С. 50.