



Thromboocclusive Lesions of the Bronchocephalic Arteries: Treatment Options and Phytotherapy Options

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Abstract: *Data on the risk and frequency of primary and repeated ischemic strokes in thromboocclusive lesions of brachycephalic arteries are summarized. The evaluation of medical and surgical methods of treatment of patients in this group was carried out. The addition of phytotherapy indicated a significant decrease in the number of all lesions of the brain and cardiovascular system within 5 years.*

Keywords: *Bronchial artery, atherosclerosis, phytotherapy, treatment methods.*

The leading cause of ischemic damage to brain tissue in the structure of cerebrovascular diseases is atherosclerotic occlusive lesion of brachiocephalic arteries [7,17,19]. Currently, the relationship between the intima-media index and cardiovascular risk has been proven. For example, the Rotterdam epidemiological study included 7983 residents of this city over the age of 55 who had the thickness of the intima-media complex (TIM) of the carotid artery measured by ultrasound [2,3]. The average follow-up period was 2.7 years. During this time, 95 strokes occurred in the population. The risk of stroke increased with increasing TIM. Similar results were obtained in another study conducted in the USA [4] in 5858 people over 65 years of age, the relationship between the TIM of the common carotid artery and the incidence of strokes was studied. The average follow-up period in this study was 6.2 years, and 284 strokes occurred during this time. It was shown that an increase in TIM by 0.2 mm is associated with an increase in the risk of stroke by 33-43%. Patients with stenoses and occlusions of brachiocephalic and intracranial arteries, despite medical treatment (statins, antiplatelet agents, anticoagulants), belong to the category of high risk of stroke [5,6]. Population studies have shown that 30-50% of ischemic episodes, both permanent and temporary, are complications of atherosclerotic plaques [11,12,15]. According to the Institute of Neurology, the structure of lesions of the vascular system of the brain that caused the development of a cerebral infarction is presented as follows: atherosclerotic stenoses and thrombosis — 84%, kinks — 8%, extravasal compression and thromboembolism - 4%. The probability of stroke in patients with atherosclerosis depends on the size of the atherosclerotic plaque, its morphology and localization, the state of cerebrovascular reactivity, the presence of previous episodes of cerebral ischemia and a number of other reasons. With asymptomatic stenoses of 50-99% of the lumen of the internal carotid artery (ICA), the risk of developing cerebral ischemia is 2-5.2% per year [18,19]. The annual risk of cerebral ischemia in patients with asymptomatic ICA occlusion is 2-4%. The risk of recurrent strokes is higher. Drug treatment Rheological shifts in the direction of increased blood clotting and an increase in the processes of thrombosis are among the main pathogenetic processes leading to the development of acute cerebral circulatory disorders and the progression of chronic circulatory disorders in the brain. Currently, the standard of treatment for vascular diseases of the brain is the appointment of antiplatelet therapy. In the last decade, a new direction of pharmacological correction

of vascular diseases of the brain has been formed, based on the regulation of the multifaceted properties of platelets. At the same time, the main purpose of this intervention is to stop thrombosis at the stage of formation of platelet aggregates. At the same time, despite the presence of a wide arsenal of antiplatelet agents, the Research Institute of Neurology, the effectiveness of antiplatelet agents and their use in clinical practice often faces a number of problems. Thus, the issues of determining the true therapeutic or preventive action of certain antiplatelet agents remain unresolved and controversial. The results are ambiguous, indicating the effectiveness of their various doses (in particular, aspirin, dipyridomol), there is practically no data on the study of individual sensitivity and the frequency of resistance to them in individual patients. In a large number of studies, there is no evidence of the effectiveness of primary prevention of cerebral infarction with aspirin in people who do not suffer from cerebrovascular and cardiovascular diseases. Thus, it was noted that aspirin at a dose of 325 mg does not have a significant long-term protective effect in people with severe asymptomatic carotid stenosis of more than 50%. The incidence of recurrent ischemic strokes in different groups ranged from 16 to 42% during the first 5 years. Aspirin in any dose prevents the development of only 13% of ischemic disorders of cerebral circulation. At the same time, aspirin at a dose of more than 75 mg per day leads to a significant decrease in prostacyclin synthesis, which in patients with vascular lesions is already disrupted due to vascular endothelial dysfunction. Daily intake of high doses of aspirin leads to an increase in blood pressure due to the almost complete suppression of the synthesis of depressive prostanoids, as well as to an increase in the frequency of hemorrhagic strokes and deterioration of endothelium-dependent vasodilation. Effective inhibition of platelet aggregation (by 50% or more of the baseline level) with aspirin is noted only in half of cases, and in 20% of patients a paradoxical proaggregant effect is possible. The prevalence of resistance to aspirin is up to 50%, and up to 75% of vascular events occur against the background of ongoing aspirin therapy. The frequency of occurrence of decreased platelet sensitivity to acetylsalicylic acid (ASA) in patients with chronic cerebral ischemia is determined by a high degree of intravascular blood clotting intensity, low activity of endogenous anticoagulants, high induced platelet aggregation (for ristocetin, thrombin, ADP), hypertriglyceridemia and a high content of very low density lipoproteins. Thus, according to South Korean authors, resistance to aspirin and clopidogrel is observed in 17 and 63% of cases, respectively, in patients who have suffered thromboembolic complications after neurointervention. Despite the fact that ASA is considered the standard of secondary prevention of ischemic events, "dual" antithrombotic therapy with a combination of drugs that have different effects on the platelet link is of considerable interest. The prospects for the combined use of ASA and clopidogrel, which had high hopes, despite the results of the MATCH study (Management of Atherosclerosis with Clopidogrel in High Risk Patients with Recent Transient Ischemic Attack or Ischemic Stroke), were not confirmed in a large-scale study of CHARISMA (Clopidogrel for High Atherothrombotic Risk and Ischemic Stabilization, Management and Avoidance). The results of the CHARISMA study did not show the advantages of a combination of clopidogrel and low doses of ASA for the prevention of atherothrombotic events compared with ASA monotherapy. The combination of cardio- and cerebrovascular pathology is often found in practice, which is logical: atherosclerosis of the arteries is a systemic process, although its manifestations are in the competence of different specialists, cardiologists, angioeducologists, angiosurgeons. The effectiveness of pentoxifylline and other vasoactive drugs from the standpoint of evidence-based medicine in clinical angioeducology has not been considered. The frequency of the primary endpoint (the development of recurrent stroke), the safety of therapy did not differ significantly in the combined treatment and monotherapy groups. Another study showed 8-18% resistance to clopidogrel, after 7 days of admission in patients who had an ischemic stroke. Based on the above and according to the opinion of the present, there is no ideal drug that affects the hemorheological parameters of blood in patients with ischemic cerebrovascular diseases. Numerous epidemiological studies have proved that an increased risk of coronary heart disease and other manifestations of atherosclerotic vascular lesions is associated with an increase in blood cholesterol and the most atherogenic low-density lipoprotein cholesterol. It is known that there is no correlation between the frequency of strokes and cholesterol levels. In recent years, the problem associated with the study of the role of hypercholesterolemia and dyslipoproteinemia as an etiological factor in the

development of dementia and cerebral stroke has aroused considerable interest among researchers. In many foreign countries, the problems of primary prevention of strokes with the use of statins are most intensively studied. In 2008 the results of a multicenter randomized, double-blind, placebo-controlled study of SPARCL (Stroke Prevention by Aggressive Reduction in Cholesterol Levels) were published, in which the effectiveness of aggressive reduction of lipid levels by statins (atorvastatin at a dose of 80 mg/day) was evaluated for the prevention of recurrent vascular events in patients without coronary pathology who have suffered a transient ischemic attack (TIA) or stroke. The study involved about 5 thousand patients in 205 clinics from 27 countries, the average duration of follow-up was 4.9 years. The results of the SPARCL study showed that treatment with atorvastatin at a dose of 80 mg / day against the background of complex preventive therapy (antiplatelet agents, warfarin, antihypertensive drugs) effectively reduces the relative risk of recurrent ischemic events, regardless of the presence of coronary heart disease as a result of a decrease in total cholesterol and low-density lipoproteins in blood plasma. This made it possible to recommend intensive statin therapy for secondary prevention of strokes in patients who have had TIA or non-cardioembolic stroke, including without concomitant coronary heart disease. In general, we can say that the variety of mechanisms leading to damage to neurons in cerebral ischemia suggests, in addition to liposuction and antiplatelet agents, the presence of numerous drugs from different pharmacological groups for the treatment of cerebrovascular diseases. Drugs used to protect nervous tissue and directly affect cerebral metabolism include: modulators of calcium and sodium channels, nootropic drugs of various chemical structures, periwinkle alkaloids, ergot, alkylxanthines, etc. These drugs also affect vascular tone and rheological properties of blood and, due to this, can have an additional indirect effect on cerebral metabolism. Treatment tactics include effects aimed at the underlying disease, against which cerebrovascular disease develops (atherosclerosis, arterial hypertension, vasculitis, etc.), elimination of neurological and psychopathological syndromes, improvement of cerebral circulation and metabolic processes. Considering that the majority of patients are elderly and senile patients, it is necessary to carry out adequate therapy of concomitant somatic diseases, the course of which has a significant impact on the neuropsychiatric status of patients [16,17,18]. In most cases, long-term therapy of a patient with cerebrovascular pathology includes from 2 to 78 medications of different pharmacological groups. Such polypragmasia is not always successful in terms of prevention of acute disorders of cerebral circulation and causes iatrogenic complications. Therefore, where long-term multicomponent treatment is required, it is quite reasonable to use drugs of plant origin or phytotherapy, which leads to an increase in the effectiveness of treatment, the possibility of influencing various links in the pathogenesis of the disease, reducing undesirable side effects.

To date, the effectiveness of the use of funds from biological raw materials is not disputed, the popularity of treatment with phytopreparations or phytotherapy has an objective basis. The indicated advantages of phytotherapy give reason to consider it expedient to use it in complex therapy for the effective treatment of patients with thromboocclusive lesions of the brachiocephalic arteries and to reduce the increase in undesirable side effects of chemical synthesis drugs. Theoretical substantiation of the possibility of using phytotherapy in patients with thromboocclusive lesions of the arteries of the head and neck in phytotherapy of patients with thromboocclusive lesions of the arteries of the head and neck, the aim is to increase brain perfusion, prevent atheromatosis of the arteries (vasoprotectors), include adaptive mechanisms aimed at compensating for cerebral circulatory insufficiency. Even a cursory acquaintance with the basic discipline of traditional medicine of Asian countries: China, Korea, Tibet, India, Tajikistan and Uzbekistan, as well as with medieval sources of European medicine, makes it possible to verify the presence of a huge arsenal of medicinal plants and refined methods of treating patients with different stages of chronic cerebral circulatory insufficiency, up to severe strokes. The choice of phytotherapy for patients with thromboocclusive lesions of the main arteries of the head is reasoned by numerous data on the positive effect of phytopreparations on higher nervous activity, mental performance of people, the development of conditioned reflexes. For example, with the introduction of medicinal angelica preparations with bilateral carotid artery ligation, cognitive deficits improved in rats, which was assessed in an increase in the content of nerve growth factor and cerebral neurotrophic factor [19] In traditional medicine,

there are occasionally precedents of treatment with one or two or three plants, without the use of multicomponent standard prescriptions. But the highest bar of phytotherapy in traditional medicine is considered to be the compilation of a personalized composition of plants, taking into accounts the peculiarities of the course, stage of the disease, complications (strokes, heart attacks), specific symptoms, gender, age, condition, constitution of the patient, time of year, etc. To revive blood circulation, increase vascular resistance to alterations and achieve a number of other goals in our practice, flowers and leaves are used, as well as fruits of blood-red hawthorn, mountain ash, aronia prunus, species of rosehip, buckthorn buckthorn, aboveground part of forest geranium, meadow geranium, species of chistets, mountaineer, buckwheat, St. John's wort, the peel of the noble mandarin, the fruits of fragrant dill, common fennel, star anise. A powerful vasoprotector, antioxidant, anti-destructive, anti-dyslipidemic, antidiabetic agent (that is, a regulator of morphological and biochemical homeostasis) are the flowers, at least the leaves of the vyazolistny laburnum, the naked laburnum [2,3]. Essential oil plants that prevent pathological vasoconstriction, carrying out many other effects aimed, in particular, at the normalization of vascular functions — these are the types of mint, catnip, schizonepeta, thyme, ziziphora, oregano, ciliate, lemon balm, spiky lavender, anise, black currant, the need to reduce irritability, negativism, aggression, anxiety, normalization of the psycho-emotional status of patients, elimination of symptoms of pathological menopause, in addition to achieving other, no less significant effects, forces to include in the collections, not only those listed above (lavender, melissa, oregano and other essential oil species), but also other plants, it is not by chance that for many centuries they have been considered mood modulators: a leaf of ivan-tea (cypress), coriander fruits, black poplar buds, a leaf of walnut, lily of the valley of May, the aboveground part of spring adonis, motherwort species, flowers and a leaf of elderberry, roots of peony species, angelica, rhizome of calamus, medicinal ginger, aromatic turmeric, true kalgan (alpini), fruits of medium cardamom, star anise, nutmeg, etc. The effective use of this principle also makes the phytotherapist think about combining the plants listed above, roughly, unjustifiably treated only as sedatives, with classical and lesser-known phytoadaptogens: ginseng, eleutherococcus, aralia, zamanikha, acanthopanax, colopanax, ivy, safflower leucea, rhodiola rosea, purple ochita, large ochita, Chinese lemongrass. The most significant properties of all, but especially of plants belonging to the Araliaceae family are energizing, toning, anti-altering, anti-destructive, stress-limiting, normalizing the functions of the endocrine glands, the immune system, optimizing reparative processes properties [1,2,3].

It is necessary to introduce plants with high anti-inflammatory properties into the collections, which can include many previously named: classical phytoadaptogens, dioscorea species, various algae, laburnum, plants of the Ginger family and many others. The undisputed leader in this and a number of other areas is the plant most often used in the systems of traditional medicines of Asian countries — the root of licorice Ural or licorice naked [1]. There are a great many plants that exhibit anti-atherogenic activity, among others, but we will list the ones available to us and used by us: the aboveground part of the common heather, the root of the sweet potato dioscorea, kelp (sea cabbage), fucus bubblegum and other algae, mandarin peel, nadz. part of blueberries, blueberries, birch leaf, well-known choleric and hepatoprotectors (immortelle, corn stigmas, calendula, milk thistle, rosehip, tansy, liverwort, goldenrod), aronia, mountain ash, flax seed [1,2,3]. It is known that the vast majority of plants contain salicylic acid itself (willow acid, willow — *Salix*) and its derivatives. They are found in the greatest amount in plants such as willow species, laburnum (anticoagulant properties have been established), leaf and branches (less — fruits) of raspberry ordinary. Plant salicylates never cause complications inherent in therapy with a synthetic substance — aspirin. Moreover, they prevent toxic and dystrophic lesions caused by aspirin and other nonsteroidal anti-inflammatory drugs. Along with antiplatelet phytotherapy, a very moderate anticoagulant is also administered with the help of white clover, from which the first anticoagulant, the coumarin dimer dicoumarin, was isolated. Clinical confirmation of the possibility of using phytotherapy in patients with thromboocclusive lesions of the arteries of the head and neck, there are very few works devoted to the problems of treating patients with a rough stenosing process of brachiocephalic arteries by phytotherapy methods. Chinese researchers conducted a double-blind randomized study in 78 elderly patients with coronary heart disease, divided into two equal groups: a group taking a herbal medicine

of traditional Chinese medicine and a group taking pravostatin. After the course of treatment, similar reliable positive data were obtained in both groups on a decrease in the carotid artery intima index, improvement of endothelium-dependent vasodilation of the brachial artery, an increase in the concentration of nitric oxide and a decrease in endothelin-1 blood plasma. The work of Chinese neurologists deserves attention, which echoes our research, which compared the effectiveness of various approaches in the treatment of patients with stenosing atherosclerosis of brachiocephalic arteries. Thus, 65 patients with atherosclerotic lesions of the brachiocephalic arteries were randomized into 3 groups: the first group (22 patients) received traditional Western treatment — aspirin, clopidogrel, statins, etc. D., the second group — 21 patients — were treated with traditionally Chinese herbal preparations and the 3rd group - 22 patients received combination therapy combining drugs of the 1st and 2nd groups, against the background of treatment, the indicators of C-reactive protein, platelet aggregation, fibrinogen levels, the number and size of atherosclerotic plaques were evaluated. After 6 months of treatment, positive dynamics was achieved in all groups both in biochemical parameters and in the morphology of atherosclerotic plaques, but when evaluating the effect of therapy, an increase in the number of patients with a positive effect of therapy with combination therapy was noted (in the Western medicine group 42.9%, in the Chinese medicine group 39.1%, and in the combined therapy group 61.5%. (The differences in χ^2 are not reliable, our calculation.) Similar results were obtained by another group of authors on reducing the number of atherosclerotic plaques, the area and degree of stenosis of the carotid arteries, normalization of the resistance index in 45 patients who received a phytopreparation of traditional Chinese medicine for 3 months in addition to standard drug therapy. If a positive clinical result is beyond doubt, then the possibility of copying herbal remedies is difficult, because the composition of the drugs is not disclosed. It is significant that several authors have received similar results confirming the need to introduce methods and principles of phytotherapy into the practice of neurology. Separately, Chinese colleagues are working to study the possibility of phytotherapy to correct violations of the rheological properties of blood plasma of patients with cerebrovascular diseases. Prospective, randomized, double-blind, placebo-controlled studies have shown the effectiveness of medicinal plants of Chinese traditional medicine in relation to plasma, trophic hemostasis, fibrinolysis system in both healthy volunteers and patients with cardiac and cerebrovascular diseases. Thus, at present, the problem of treating patients with hemodynamically significant stenoses or occlusions of the main arteries of the neck is far from being solved: drug therapy is not always effective, surgical treatment in our country is not put on stream, carries the risk of postoperative complications, some patients refuse to carry it out for paramedical reasons. At the same time, insufficient attention is paid to the possibility of phytotherapy for a group of patients with severe atherosclerotic lesions of the main arteries of the head. Isolated works of Chinese researchers, the results of which coincide with those obtained by us, demonstrate the high effectiveness of phytotherapy when it is introduced into the standard of treatment of this group of patients. So, in our study, the combination of medication and herbal medicine led to a reduction of almost 10 times the number of cerebral and cardiovascular episodes during a 5-year follow-up.

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