

Coronary artery bypass grafting

Medical rehabilitation of patients with coronary heart disease after coronary artery bypass surgery.

Despite significant advances in the field of pharmacotherapy of patients with coronary heart disease (CHD), surgical treatment of this category of patients, in particular, direct myocardial revascularization, coronary artery bypass grafting (CABG), is the most effective in some cases [1–3]. As a result of the operation, coronary blood flow is restored, which eliminates or reduces myocardial hypoxia [5, 7, 8]. However, surgical treatment does not eliminate the main causes of the disease; it can be considered only as one of the stages in the complex treatment of coronary artery disease. In addition, severe surgical trauma, which is CABG, naturally causes complex and diverse reactions of the body [2, 4, 8]. Being protective and adaptive in nature, they can acquire a pathological character and manifest themselves in various complications both immediately after the intervention and in the later rehabilitation period. Overcoming the consequences of surgical intervention, prevention and treatment of early and late postoperative complications largely determine the effectiveness of the entire complex of rehabilitation measures [1–3, 5, 7].

An analysis of literature data [1, 2, 4] and the results of our own studies [3, 5, 8] made it possible to identify a number of general patterns of clinical course and pathogenetic changes accompanying the postoperative period in patients with coronary artery disease, which is characterized by the following main syndrome complexes: cardiac, poststernotomy, respiratory, hemorheological with psychopathological, hypodynamic, microcirculation disorders, metabolic, postphlebotomy.

Of great importance is the hyperthrombotic syndrome, which is characterized by pronounced changes in the blood coagulation and anticoagulation system, hematocrit, yield strength, blood viscosity, and an increase in the functional activity of platelets [2, 5, b]. An increase in the blood coagulation potential in patients with IHD is evidenced by a significant increase in the level of fibrinogen, as well as a significant increase in the content of soluble fibrinogen and fibrinogen-fibrin degradation products. Violation of the rheological properties of blood leads to a decrease in the supply of oxygen to tissues [3]. In addition, in patients with coronary artery disease after CABG in the postoperative period, signs of disseminated intravascular coagulation syndrome are detected, the development of which also contributes to the disruption of blood microcirculation (MC), and therefore the search for new means to improve it is relevant. These agents include the bioflavonoid Dihydroquercetin (Capilar), obtained from the wood of Dahurian larch and Siberian larch.

Dihydroquercetin (Capilar) has a stimulating effect on tissue blood flow, stabilizes the barrier function of microvessels, reduces the permeability of capillary walls and thus helps to reduce the severity of congestion in the microvasculature. Studying the possibility of using Dihydroquercetin in rehabilitation programs for patients with IHD

after CABG in order to improve the efficiency of rehabilitation is of great scientific and practical importance.

In patients with coronary artery disease, including those after coronary artery bypass grafting, blood microcirculation is disturbed.

We have studied the possibility of optimizing the medical rehabilitation of patients with coronary artery disease after CABG by improving MC using Dihydroquercetin (Capilar).

The material of the study was the results of observation, examination and rehabilitation of 30 patients with coronary artery disease who underwent CABG, who were admitted to the rehabilitation center on days 12–17 (on average, on days 15.2 ± 3.2) after surgical treatment. The age of the patients ranged from 32 to 68 years (average 47.6 ± 3.2 years). The most numerous was the age group of 41–50 years. The average number of shunts per 1 patient was 2.3 ± 0.8 . When studying the anamnesis, it was found that 19 (63.3%) patients had myocardial infarction before the operation. According to the NYHA classification, upon admission, 3 (10%) patients were assigned to functional class I (FC), 10 (33.3%) - to II, 15 (50%) - to III and 2 (6.6%) - to IV.

IV. The vast majority of patients are highly emotional mental workers.

Among the comorbidities, the most common were hypertension - in 16 (39.5%) patients, obesity - in 8 (26.6%), peptic ulcer - in 5 (16.6%), chronic bronchitis - in 6 (20%), chronic gastroduodenitis — in 7 (23.3%), diabetes mellitus type 2 — in 3 (10%). Most patients systematically smoked 20 to 40 cigarettes a day.

Of the early postoperative complications affecting the course of rehabilitation, there were cardiac arrhythmias, complications from postoperative wounds, reactive pericarditis and hydrothorax. At the stage of rehabilitation, patients most often complained of shortness of breath during normal physical exertion, general weakness, pain along the postoperative scar of the sternum, and sleep disturbance.

Upon admission to the rehabilitation center, all patients were examined according to the developed program, which included laboratory diagnostics and a set of functional diagnostic studies: electrocardiography with determination of pressure in the pulmonary artery; conjunctival biomicroscopy; study of the function of external respiration (RF); computer analysis of low-amplitude morphological variations of the QRST complex (cardiovisor); echocardiography (EchoCG); bicycle ergometry (VEM); psychological research.

The comprehensive rehabilitation program for 20 patients of the main group included: climate-motor mode; diet with restriction of animal fats; climatotherapy in the form of aerotherapy during walks; physiotherapy; dosed walking; physiotherapy procedures; massage of the cervicothoracic spine; drug treatment - antiplatelet agents, B-blockers, diuretics according to indications, taking a dietary supplement (BAA) "Capilar" - 3 tablets in the morning and at lunchtime and 2 tablets in the evening during a meal. IN

rehabilitation program for 10 patients of the control group Kapilar did not turned on.

The study of MC in patients with coronary artery disease after CABG showed that among the general signs of microcirculatory disorders, the most informative were background turbidity, arteriole tortuosity, uneven caliber of venules, and venule tortuosity.

All MC integrative parameters (vascular, extravascular and intravascular) were changed. MC disorders at admission were characterized by combined vascular, intravascular and extravascular changes in the terminal vessels. Areas of focal stasis were usually absent. Structural changes in microvessels persisted, in some cases there was a tendency to decrease in the degree of expansion of the vessels of the postcapillary-venular link, uneven diameter of their diameter throughout the microvessel.

As a result of complex rehabilitation with the use of Kapilar, the number of functioning capillaries increased, the severity of arteriole spasm decreased, arterio-venular ratios and the diameter of microvessels normalized. Positive dynamics of the general conjunctival (CI), vascular (CI1), extravascular (CI2), and intravascular (CI3) indices were revealed (Table 1).

In the study of the dynamics of respiratory function in patients of both groups, an increase in capacitive and speed indicators was noted.

At the same time, a more pronounced increase in respiratory function was observed in patients with coronary artery disease, whose comprehensive rehabilitation program included taking Kapilar. Apparently, despite the fact that Dihydroquercetin does not have a direct effect on the parameters of respiratory function, all ventilation-perfusion effects are mediated by its effect on the central and peripheral hemodynamics and, above all, on the MC parameters [b].

Improvement in MC and FVD indicators contributed to the positive dynamics of indicators of the acid-base state (ACS) and blood gases (Table 2).

As can be seen from the data in Table. 2, in patients of the main group, there was a more significant improvement in blood oxygenation than in the control, which was confirmed by a significant increase in PO₂ and a decrease in blood Pco₂.

Positive dynamics of MC parameters, improved blood oxygenation ensured an increase in myocardial contractility, its propulsive force, a decrease in mean pulmonary artery pressure (Mean PAP), which ultimately contributed to a significant increase in exercise tolerance (ET) in most patients of the main group (Table 3).).

The results of the study showed the high clinical efficacy of Kapilar in the complex medical rehabilitation of patients with coronary artery disease who underwent CABG. The drug did not affect the parameters of carbohydrate and lipid metabolism, which indicates its metabolic neutrality. None of the patients had a deterioration in the condition and an increase in angina attacks and episodes of painless ischemia. All patients reported good tolerance

drug, improvement of general well-being (reduction or disappearance of shortness of breath, decrease in the intensity of retrosternal pain, increased activity, improved sleep).

The implementation of an optimized rehabilitation program also contributed to the improvement of the psycho-emotional state of patients. Their mood improved, the index of reactive anxiety (RT) decreased statistically significantly - from 48.2 ± 4.1 to 34.4 ± 3.0 points ($p < 0.01$); in patients of the control group, the RT index decreased from 46.4 ± 5.1 to 39.5 ± 4.4 points ($p > 0.05$). Statistically insignificant decrease in the scores on the scales of the neurotic triad (on the 1st - from 60.1 ± 1.34 to 57.5 ± 1.37 T-points; on the 2nd - from 59.7 ± 1.22 to 56.5 ± 1.27 T-points; according to the 3rd - from 61.4 ± 1.32 to 58.5 ± 1.35 T-points; $p > 0.05$) in patients of the main group indicates persistent psychological maladaptation in some of the operated patients, which requires appropriate correction.

The development of microcirculatory disorders in coronary artery disease, including after CABG, is mainly due to changes in the rheological properties of blood due to impaired deformability of erythrocytes, increased aggregation of them and platelets, increased hemostatic and reduced fibrinolytic potential of blood, latently occurring disseminated blood coagulation syndrome, as well as changes dynamics of microvessels, which leads to an increase in the volume of the microvasculature, centralization of blood flow and inefficiency of the MC [5, 7–9].

The use of Kapilar in patients after coronary artery bypass grafting increases the effect of rehabilitation.

Stagnation, deposition of blood in capillaries, venules contributes to a decrease in venous return of blood to the heart and, in this regard, a decrease in cardiac output and a violation of tissue oxygenation. In turn, disturbances in the rheological properties of blood associated with the aggregation of erythrocytes and accompanied by a decrease in the number of the latter, further disrupt the supply of oxygen to tissues. The main cause of tissue hypoxia is the development of a mechanical microcirculatory block. It can be assumed that pronounced disorders of pulmonary ventilation in patients cause hypoxia and metabolic disorders in tissues. This leads to the appearance of a number of vasoactive microvascular disorders and substances that contribute to the development of intravascular aggregation, which, in turn, maintains and exacerbates tissue metabolic disorders. hypercoagulability disorders, respiratory and circulatory failure, based on decreased reserve MC capacity of the cardiorespiratory system, which is clinically manifested by a decrease in TF, respiratory and heart failure [5, 7].

The positive dynamics of most indicators of the cardiorespiratory system during rehabilitation according to the program with the inclusion of Dihydroquercetin indicates an improvement in MC, normalization of CBS and blood gases, an increase in TFN, elimination and reduction in the severity of manifestations of respiratory and heart failure in the bulk of patients.

The results of the study suggest that Dihydroquercetin (Capilar) indirectly affects the central and peripheral

hemodynamics, improves intracardiac hemodynamics, improves respiratory function and blood gases. The drug also eliminates spasm of the arteries, including the coronary ones [5].

With a pronounced atherosclerotic lesion of the coronary arteries, even minimal changes in the normal tone of smooth muscles in the areas of narrowing can aggravate ischemia or contribute to its reduction. A decrease in ischemia may also be a consequence of the relaxation of the normal tone of the smooth muscles of the stenotic sections of the coronary arteries. In addition, taking Kapilar prevents and relieves spasm in both normal and atherosclerotic coronary arteries, and thereby helps to eliminate microangiopathy [1, 5–8].

Thus, the complex medical rehabilitation of patients with coronary artery disease after CABG according to the program with the inclusion of Dihydroquercetin (BAA "Capilar") helps to improve the rheological properties of blood, enhance the active vasomotor mechanisms of MC regulation, improve the indicators of central and peripheral hemodynamics, respiratory function, blood oxygenation, increase TFN, improvement of the psycho-emotional state of patients, which ultimately provides an increase in the rehabilitation effect.

Literature 1.

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