



Comprehensive approach to the treatment of patients with coronary artery disease within medicine framework

Enfoque integral del tratamiento de pacientes con enfermedad arterial coronaria. Dentro del marco de la medicina

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Abstract

The article is devoted to an integrated approach to the treatment of patients with coronary heart disease (CHD) in clinical practice. Modern methods of diagnosis and treatment aimed at improving the quality of life and prognosis of patients with this disease are considered. The article emphasizes the necessity of multidisciplinary approach, including drug therapy, surgical intervention (if necessary), as well as lifestyle modification. The main groups of drugs used in the treatment of CHD, such as antiaggregants, statins, beta-blockers, ACE inhibitors and calcium channel

blockers are described. Special attention is given to the role of rehabilitation measures and secondary prevention to prevent complications. The authors emphasize the importance of an individualized approach to each patient depending on the stage of the disease, comorbid conditions and general health status.

Key words: coronary heart disease, complex approach, treatment, drug therapy, surgical intervention, rehabilitation, secondary prevention, cardiology, lifestyle modification, individualized approach.

El artículo está dedicado a un enfoque integrado del tratamiento de pacientes con enfermedad coronaria (CHD) en la práctica clínica. Se consideran métodos modernos de diagnóstico y tratamiento destinados a mejorar la calidad de vida y el pronóstico de los pacientes con esta enfermedad. El artículo enfatiza la necesidad de un enfoque multidisciplinario, que incluya terapia farmacológica, intervención quirúrgica (si es necesaria) y modificación del estilo de vida. Se describen los principales grupos de fármacos utilizados en el tratamiento de la enfermedad coronaria, como los antiagregantes, las estatinas, los betabloqueantes, los inhibidores de la ECA y los bloqueadores de los canales de calcio. Se presta especial atención al papel de las medidas de rehabilitación y prevención secundaria para prevenir complicaciones. Los autores enfatizan la importancia de un enfoque individualizado para cada paciente según el estadio de la enfermedad, las condiciones comórbidas y el estado de salud general.

Palabras clave: enfermedad coronaria, abordaje complejo, tratamiento, farmacoterapia, intervención quirúrgica, rehabilitación, prevención secundaria, cardiología, modificación del estilo de vida, abordaje individualizado.

Coronary heart disease (CHD) is one of the most common and serious diseases of the cardiovascular system with a significant impact on morbidity and mortality worldwide. CHD results from impaired blood supply to the heart muscle due to atherosclerotic changes in the coronary arteries. This leads to the development of various clinical forms of the disease such as angina pectoris, myocardial infarction and chronic heart failure.

Modern approaches to the treatment of CHD are aimed not only at eliminating symptoms and improving the quality of life of patients, but also at reducing the risk of severe complications such as myocardial infarction, sudden cardiac death and progressive heart failure. In this regard, a comprehensive approach that includes

both drug therapy and surgical treatment methods, rehabilitation and modification of the patient's lifestyle plays an important role.

Drug therapy is a major component of CHD treatment and includes the use of antiaggregants, beta-blockers, statins, ACE inhibitors and calcium channel blockers. These drugs help control major risk factors such as arterial hypertension, hypercholesterolemia and increased blood clotting. Drug treatment aims to improve coronary blood flow, reduce myocardial oxygen demand and stabilize atherosclerotic plaques, which in turn reduces the likelihood of acute coronary events.

Surgical methods, such as coronary artery bypass grafting and angioplasty with stent placement, are used when conservative therapy is ineffective and the risk of complications is high. These methods can restore blood supply to the myocardium, reducing the severity of symptoms and improving the patient's prognosis.

Rehabilitation is also an integral part of a comprehensive approach, including physical activity programmes, psychological support and patient education to control risk factors. Regular physical activity, proper nutrition and avoidance of bad habits play a key role in preventing disease progression and recurrent episodes of ischemia.

Special attention is paid to an individualized approach to each patient, taking into account their clinical condition, co morbidities and lifestyle. This allows the treatment to be tailored to meet specific needs and minimize the risk of undesirable side effects. An important role in this process is played by active interaction between doctor and patient, which helps to improve compliance and increase the effectiveness of therapy.

Thus, a comprehensive approach to the treatment of patients with CHD requires the involvement of various specialists and the application of a range of therapeutic and preventive measures. Modern medicine strives not only to prolong the life of patients, but also to improve its quality through individualized treatment methods, which is especially important in chronic diseases such as coronary heart disease.

W

hen writing an article on the topic of an integrated approach to the treatment of patients with coronary heart disease (CHD), various theoretical methods were used, which allowed us to analyze the problem in depth, systematize the data and justify the conclusions.

The analysis of scientific literature included a thorough review and comparison of data from scientific publications, clinical guidelines, meta-analyses and other authoritative sources. This method allowed us to identify modern approaches to the treatment of CHD, systematize knowledge about new therapeutic strategies and evaluate their effectiveness. Not only drug treatment, but also surgical interventions, rehabilitation programmes and modification of patients' lifestyle were analyzed.

Comparative analysis made it possible to compare different approaches to the treatment of CHD: for example, to assess the advantages and disadvantages of drug therapy compared to surgical methods. The method of synthesis was used to integrate the different data and evidence to draw general conclusions. In the context of CHD, this involved summarizing clinical guidelines, research findings and expert opinion to form a general concept of comprehensive treatment. This method helps to systematize and simplify complex information for further application in clinical practice.

The systemic approach allowed us to consider the treatment of CHD as a complex of interrelated interventions. This method implied taking into account all factors influencing the course of the disease, including not only medical, but also social, psychological and behavioral aspects.

Results. Modern diagnostic methods for coronary heart disease (CHD) have evolved significantly over the past decades, providing physicians with more accurate and efficient tools to detect and evaluate the disease in its early stages¹. These methods aim to detect atherosclerotic changes in the coronary arteries, assess the functional status of the myocardium and determine the risks of cardiac complications.

The resting ECG is the standard method for diagnosing CHD, especially in acute conditions such as myocardial infarction. It allows detection of signs of ischemia (e.g. ST-segment changes), rhythm and conduction disturbances. Stress ECG (stress test) is used to diagnose hidden ischemia, which may not be apparent at rest. During exercise (treadmill or cycle ergo meter), ECG changes are recorded, which may indicate decreased coronary blood flow with increased cardiac workload².

Transthoracic echocardiography (TTE) allows assessing the structure and function of the heart, to detect myocardial hypokinesia, akinesia or dyskinesia, which are signs of ischemia or infarction. Echocardiography also helps to detect complications such as aneurysms or valve abnormalities³. Stress echocardiography provides an opportunity to assess the response of the heart to exercise or pharmacological stimulation (with dobutamine) and to identify areas of myocardium with impaired blood supply. This test is used to diagnose hidden ischemia and assess myocardial viability.

CT coronography as a non-invasive diagnostic method allows visualizing coronary arteries and determining the presence of atherosclerotic plaques, the degree of their calcification and stenosis. Modern scanners allow obtaining a three-dimensional image of coronary vessels, which is especially important when evaluating patients with noninvasive methods or when planning surgical intervention⁴.

Calcium scoring (CAC score) provides an opportunity to assess the degree of coronary artery calcification, which is an important marker of atherosclerosis and a predictor of the risk of cardiovascular events. Cardiac MRI with contrast is a method by means of which the degree of myocardial damage can be assessed, scar changes after infarction can be detected and tissue viability can be determined. MRI allows accurate differentiation between ischemic and non-ischemic causes of myocardial damage.

MRI angiography of the coronary arteries is used less frequently than CT to visualize the coronary arteries, but it can be useful in a number of cases, especially when there are contraindications to the contrast agents used in CT⁵.

Using a method such as myocardial single photon emission computed tomography (SPECT), myocardial perfusion can be assessed by injecting radioactive isotopes (technetium or thallium). The method is used to detect ischemia and assess myocardial viability. It is often used in combination with stress tests.

Positron emission tomography (PET) is used to more accurately study myocardial perfusion and metabolism. It is a highly accurate method that allows to assess the level of oxygen metabolism in cardiac tissue and to identify areas with ischemia or damage⁶.

Coronary angiography remains the gold standard for the diagnosis of coronary heart disease and is performed when other non-invasive diagnostic methods show significant stenosis or the patient requires intervention. It is performed by inserting a catheter through the femoral or radial artery and injecting a contrast agent, allowing real-time visualization of the coronary arteries and accurate assessment of their patency.

Fractional blood flow reserve (FFR) is used during coronary angiography to assess the functional significance

of an identified stenosis. FFR measures the pressure drop before and after vessel narrowing and determines whether it is haemodynamically significant. This method helps physicians decide whether stenting or bypass surgery is necessary. Optical coherence tomography (OCT) is a high-precision technology that allows high-resolution visualization of the inside of the coronary arteries. It is used to assess the structure of atherosclerotic plaques and determine their vulnerability (e.g. thin fibrotic cap). This method can be used for planning and monitoring of stenting⁷.

The use of genetic tests to identify predisposition to the development of CHD and other cardiovascular diseases has received particular attention to date. These tests help to assess individual risks and offer more personalized approaches to the prevention and treatment of CHD.

Modern telemedicine and remote monitoring technologies allow real-time monitoring of ECG, blood pressure and other parameters. This is especially important for patients at high risk of acute coronary events or those who have recently suffered a myocardial infarction. Smart watches and other devices with heart rhythm monitoring functions help to detect arrhythmias and ischemic episodes at an early stage.

Psychosocial factors play an important role in the development of CHD. Modern diagnostic approaches include assessment of stress, anxiety and depression, which may worsen prognosis in patients with cardiovascular disease. Psycho cardiology is becoming an important part of the overall diagnosis and treatment of patients with CHD⁸.

Modern methods of diagnostics of coronary heart disease have significantly expanded the possibilities of doctors to detect the disease at early stages, to accurately assess anatomical and functional changes in the coronary arteries, and to predict treatment outcomes. The use of high-tech non-invasive and invasive methods allows not only to detect CHD with high accuracy, but also to optimize treatment approaches, increasing its effectiveness and safety for patients.

Modern methods of treatment of coronary heart disease (CHD) are a combination of drug therapy, invasive procedures and lifestyle changes aimed at improving the quality of life, preventing complications and reducing the risk of mortality. Each patient receives an individualized approach based on the characteristics of their disease, the presence of co morbidities and general health. A comprehensive approach is important in the treatment of CHD, which includes both therapeutic and surgical methods⁹.

Consider the specifics of drug treatment. Antiaggregants are drugs that reduce platelet aggregation and prevent the formation of blood clots in the coronary arteries. They are the mainstay of treatment for CHD, especially in patients at high risk of acute coronary events.

Statins lower cholesterol levels and prevent the progression of atherosclerosis by stabilizing atherosclerotic plaques and reducing the risk of plaque rupture. Beta-blockers lower heart rate and reduce myocardial oxygen demand, which reduces the risk of ischemia. These drugs are used both in stable angina pectoris and after myocardial infarction to prevent recurrent coronary events¹⁰.

Angiotensin-converting enzyme (ACE) inhibitors and angiotensin II receptor blockers (ARBs) are used to lower blood pressure protect the myocardium and improve prognosis in CHD, especially in patients with heart failure or diabetes. Calcium channel blockers reduce coronary artery spasm, dilate blood vessels and lower blood pressure. They are used in patients with vasospastic angina and in cases where beta-blockers are contraindicated.

Nitrates dilate the coronary arteries and improve blood flow, quickly relieving angina attacks. There are short-acting and long-acting forms. Anticoagulants prevent thrombosis, especially when there is a risk of venous thrombosis or thromboembolism.

Invasive treatments are also extremely important. Percutaneous coronary intervention (PCI) includes procedures to dilate narrowed coronary arteries and restore blood flow¹¹. The most common procedure is stent placement. Angioplasty - a procedure in which a balloon is inserted into the narrowed part of the artery and inflated, widening the lumen of the vessel. Stenting is the placement of a stent (metal mesh tube) that maintains the artery in a dilated state after angioplasty.

Drug-coated stents are used to prevent restenosis (re-narrowing of the vessel). PCI is the treatment of choice for many patients with acute coronary syndrome (e.g. myocardial infarction) or stable angina that is not responding to drug therapy.

Coronary bypass surgery is a surgical procedure that creates bypass routes for blood around narrowed or blocked coronary arteries. Segments of arteries or veins from other parts of the body (usually the leg) are used to direct blood to bypass the affected areas of the coronary vessels¹².

ACS is indicated for multiple coronary artery disease, especially if trunks or large vessel segments are affected.

Cardiac rehabilitation plays a key role in recovery after myocardial infarction, stenting or bypass surgery. It includes exercise, dietary modification, psychological support and control of risk factors. Rehabilitation programmes help to improve patients' physical condition, reduce the risk of recurrent coronary events and improve quality of life.

Lifestyle changes are an essential part of the treatment of CHD. A diet low in saturated fat and cholesterol, rich

in fruit, vegetables, fish and healthy fats (e.g. omega-3 fatty acids) is recommended.

Regular exercise (e.g. walking, swimming, and cycling) helps improve cardiovascular health. Smoking is a major risk factor for the development and progression of CHD. Complete smoking cessation significantly reduces the risk of complications. Overweight and obesity increase the load on the heart and aggravate the course of CHD¹³.

It is also necessary to consider modern technologies in the treatment of CHD. Among such technologies, implantable devices occupy a special place. Pacemakers are used for patients with abnormal heart rhythms (e.g. brad arrhythmias) when the heart cannot maintain a normal rhythm.

Cardioverter defibrillators (ICDs) are placed in patients at high risk of sudden cardiac death for timely defibrillation in the event of life-threatening arrhythmias. Resynchronization therapy devices (CRT) are used in patients with heart failure to improve the coordination of heartbeats and reduce symptoms.

Telemedicine and remote monitoring systems make it possible to monitor patients with CHD from a distance, which improves monitoring of their condition and helps to adjust therapy in a timely manner. Modern devices, such as smart watches and portable ECG monitors, make it possible to detect rhythm disturbances and other changes in real time.

Research in the field of genetic and cell therapy is aimed at repairing damaged myocardium. Methods of using stem cells to regenerate cardiac tissue after myocardial infarction are promising. Immunotherapy is being investigated as a potential method of acting on atherosclerotic plaques, preventing their rupture and subsequent acute coronary events.

Modern technologies of genetics and bioinformatics make it possible to develop individualized approaches to the treatment of patients with the diagnosis in question.

Discussion

Progressive directions in the treatment of coronary heart disease (CHD) are based on new technologies, innovative therapies and personalized approaches aimed at improving treatment efficacy, minimizing side effects and improving patients' long-term prognosis¹⁴. Personalized medicine represents one of the most promising areas in the treatment of cardiovascular diseases. The use of genetic data, molecular profiling and biomarker analysis allows physicians to develop individualized treatment strategies for each patient.

Genetic testing can identify predisposition to the development of CHD, as well as determine a patient's individual response to certain drugs (e.g. antiaggregants or statins). This helps to choose more effective therapies and minimize the risk of side effects¹⁵.

Pharmacogenetic studies make it possible to predict how a patient's body will react to drugs and adjust dosages to achieve the best results. Regenerative medicine and cell therapy are aimed at repairing damaged cardiac tissue, which is especially important for patients who have suffered a myocardial infarction.

One promising area is the use of stem cells to repair damaged myocardium. Experimental studies have shown that administration of mesenchymal or cardiomyoblast stem cells promotes regeneration of cardiac tissue and improvement of its functionality after myocardial infarction.

Genotherapy research is aimed at changing the expression of genes associated with the regulation of the cardiovascular system. For example, genes that promote the formation of new blood vessels (angiogenesis) can be used to improve blood supply to the myocardium¹⁶.

Immunotherapy, traditionally used in the treatment of oncological diseases, is beginning to find application in cardiology. This technique is aimed at influencing the immune mechanisms involved in the development of atherosclerosis.

Atherosclerosis, which is the leading cause of CHD, is associated with chronic vascular inflammation. Immunotherapy can help reduce inflammation in atherosclerotic plaques, which reduces the risk of their rupture and subsequent acute coronary events. An example is the use of interleukin-1 β inhibitors (e.g. canakinumab), which have demonstrated efficacy in reducing inflammation and the risk of cardiac events¹⁷.

New classes of drugs are emerging that offer more effective ways to manage the risks of CHD, especially for patients in whom standard methods have failed. PCSK9

inhibitors are a new class of cholesterol-lowering drugs. PCSK9 inhibitors (e.g., everocumab, alirocumab) significantly lower low-density lipoprotein (LDL) levels in patients in whom statins are not effective enough or cause side effects.

RNA interference-based therapies utilize a mechanism to suppress the expression of genes associated with atherosclerosis. An example of this approach is inclisiran, which lowers LDL levels by affecting the expression of the PCSK9 gene, which reduces the progression of atherosclerosis.

Transcatheter therapies, such as placement of valves and other devices through the arteries, provide treatment options for elderly patients or those at high surgical risk. Transcatheter aortic valve implantation (TAVI) is used in patients with combined coronary artery disease and valve disease. TAVI allows valve replacement without open surgery, which significantly reduces mortality in high-risk patients. Transcatheter mitral valve plasty is used in patients with ischemic mitral valve insufficiency, which may develop against the background of CHD¹⁸.

The use of digital technology and telemedicine has revolutionized the way we monitor and manage CHD patients. Digital medicine helps to monitor symptoms more accurately, adjust treatment and identify potential risks.

Smart devices such as fitness trackers and ECG-enabled smart watches continuously monitor heart rate, blood pressure and other parameters to facilitate early detection of abnormalities and timely intervention.

AI is actively used to analyze ECG data, coronary angiography and other diagnostic procedures. It helps in fast and accurate interpretation of data, risk prediction and selection of individualized treatment.

A multidisciplinary approach in the treatment of coronary heart disease (CHD) is a key element of effective disease management, as CHD is a complex pathology that requires a comprehensive impact on various aspects of the patient's health status¹⁹. This approach combines the efforts of various medical specialists and includes drug therapy, surgery (if necessary), and lifestyle modification, which not only improves clinical outcomes but also enhances the patient's quality of life.

Rehabilitation measures and secondary prevention play a critical role in the management of coronary heart disease (CHD), helping to reduce the risk of complications and improve the quality of life of patients. Both aspects are aimed at restoring the functional capabilities of the body, preventing recurrent cardiovascular events and optimizing overall health²⁰.

Rehabilitation of patients with CHD includes a set of measures aimed at restoring physical activity, improving psychological well-being and teaching the patient self-management skills. Specially designed physical activity

programmes help to improve cardiovascular function, increase endurance and reduce the risk of recurrent cardiovascular events. These programmes may include aerobic exercise, endurance training and strength training.

It is important to monitor your heart rate during physical activity to prevent overload and unwanted effects. Rehabilitation specialists help to develop an individualized exercise plan tailored to the patient's condition²¹.

Psychological aspects such as stress and anxiety can have a significant impact on the course of CHD. Psychologists and psychotherapists provide counseling and support groups, teach stress management techniques and help patients cope with depression and anxiety. Psychological rehabilitation also includes teaching relaxation and meditation skills to help patients maintain emotional balance.

Teaching patients self-monitoring techniques, including regular measurement of blood pressure, blood sugar and cholesterol levels, as well as health diary skills, promotes awareness of their condition and active participation in the treatment process.

Knowledge of the symptoms of deteriorating conditions and the importance of following medical advice encourages timely access to medical care.

Secondary prevention is a set of measures aimed at preventing recurrent cardiovascular events in patients already diagnosed with CHD. Continuous monitoring of patients' health status, including regular visits to the doctor, tests and examinations, helps to detect possible problems at an early stage. Cardiological examinations (e.g. ECG, echocardiography) allow monitoring of the cardiovascular system and timely changes in treatment²².

Educational activities, such as trainings and seminars, help patients to better understand their disease, the importance of adherence to appointments and methods to prevent complications. Patients receive information about risk factors, symptoms of deterioration and the need to follow a healthy lifestyle.

Rehabilitation measures and secondary prevention are important components of a comprehensive approach to the treatment of CHD. They help to reduce the risk of recurrent cardiovascular events, improve the quality of life of patients and help them to participate more actively in their treatment. Systematic implementation of these interventions improves clinical outcomes and ensures long-term success in the control of CHD.

Comprehensive treatment of coronary heart disease (CHD) requires the collaboration of various specialists including cardiologists, surgeons, nutritionists, psychologists and rehabilitation specialists. Such an approach provides a complete treatment that takes into account all aspects of the patient's health.

Effective treatment of CHD includes the use of major drug groups such as antiaggregants, statins, beta-blockers, ACE inhibitors and calcium channel blockers. These drugs help control symptoms, reduce the risk of complications and improve the overall health of patients. Rehabilitation measures aimed at restoring physical activity, psychological support and teaching patients' self-management techniques are important to improve quality of life and prevent complications.

The implementation of secondary prevention, including medication, lifestyle changes and regular medical monitoring, reduces the risk of recurrent cardiovascular events and contributes to more successful disease management. Lifestyle changes, including smoking cessation, maintaining a healthy diet and regular physical activity, are a key element in the treatment and prevention of CHD. Educating patients about the importance of these changes improves their willingness to adhere to medical recommendations.

Regular check-ups and health monitoring allow for early detection of possible problems and timely changes in treatment, which helps to improve clinical outcomes. Educational programmes and seminars play an important role in raising patients' awareness of their disease, risk factors and methods of preventing complications, which in turn improves adherence to treatment.

A comprehensive approach to the treatment of patients with ischemic heart disease, including drug therapy, rehabilitation and secondary prevention, is the key to successful disease management. It not only improves clinical outcomes but also significantly improves the quality of life of patients, making it an important element in modern cardiology.

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