

THE SPECIFIC CHARACTERISTICS OF DRUGS USED IN THE TREATMENT OF CORONARY INSUFFICIENCY

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Abstract: This article presents a comprehensive analysis of coronary insufficiency (ischemic heart disease), one of the most prevalent cardiovascular disorders. The focus is placed on the pharmacological treatment methods, drug classifications, mechanisms of action, and clinical relevance of each group of medications. It also discusses the importance of individualized therapy, therapeutic strategies, and evidence-based approaches to improve the quality of life and prognosis in patients with coronary insufficiency.

Keywords: Coronary insufficiency, myocardial ischemia, nitrates, beta-blockers, calcium antagonists, antiplatelet agents, anticoagulants, statins, clinical pharmacology.

Coronary insufficiency, a major clinical manifestation of ischemic heart disease, is one of the leading causes of morbidity and mortality worldwide, including in Uzbekistan. It develops when the myocardium receives insufficient blood supply due to narrowing or occlusion of the coronary arteries, most commonly as a result of atherosclerosis or thrombosis.

The condition can be chronic (stable angina) or acute (acute coronary syndrome, myocardial infarction), each requiring an effective and timely pharmacological treatment strategy to reduce symptoms, prevent complications, and prolong life. An evidence-based pharmacological approach remains the cornerstone of modern cardiology in the treatment of coronary insufficiency.

Pathophysiology of Coronary Insufficiency.

The coronary arteries supply oxygen and nutrients to the myocardium. When these arteries become narrowed or occluded by atherosclerotic plaques, vasospasms, or thrombi, the blood flow to the heart muscle decreases. This leads to myocardial hypoxia, impaired cellular metabolism, electrophysiological imbalance, and even necrosis.

Key pathophysiological mechanisms:

- Reduced oxygen supply to the myocardium
- Increased cardiac workload (due to hypertension or tachycardia)
- Metabolic and structural changes in heart muscle cells
- Endothelial dysfunction and plaque instability

Risk factors include hypertension, diabetes mellitus, smoking, hyperlipidemia, obesity, and sedentary lifestyle - all of which must be addressed as part of the treatment strategy.

Pharmacological Treatment Strategies

The primary therapeutic goals in coronary insufficiency include:

1. Reducing myocardial oxygen demand
2. Increasing coronary blood flow
3. Preventing thrombus formation
4. Stabilizing heart rhythm and function
5. Lowering blood lipid levels
6. Improving overall cardiovascular health

Pharmacotherapy should be individualized, multifaceted, and adapted to the patient's specific clinical profile.

Main Groups of Drugs and Their Specific Characteristics

1. Nitrates. Mechanism of action: Nitrates promote the release of nitric oxide (NO), causing vasodilation. This reduces preload and afterload on the heart, decreasing oxygen demand and relieving angina symptoms.

Examples:

- Nitroglycerin (sublingual, transdermal, IV)
- Isosorbide dinitrate
- Isosorbide mononitrate

Clinical use:

- Acute angina attacks
- Chronic stable angina
- Acute heart failure (IV nitroglycerin)

Drawbacks:

- Tolerance development after prolonged use
- Headache, dizziness, hypotension

2. Beta-blockers. Mechanism of action: Beta-blockers inhibit beta-adrenergic receptors, reducing heart rate and myocardial contractility. This decreases oxygen consumption and stabilizes heart rhythm.

Common agents:

- Metoprolol
- Atenolol
- Bisoprolol
- Carvedilol

Clinical benefits:

- Post-MI mortality reduction
- Effective in hypertension and tachyarrhythmia
- Long-term use improves prognosis

Cautions:

- Contraindicated in asthma and bradycardia
- May cause fatigue, cold extremities, sleep disturbances

3. Calcium Channel Blockers (CCBs). Mechanism of action: CCBs block calcium influx into vascular smooth muscle and myocardial cells, leading to vasodilation and reduced contractility.

Subtypes:

- Dihydropyridines (Amlodipine, Nifedipine): Strong vasodilators
- Non-dihydropyridines (Verapamil, Diltiazem): Also affect heart rate and contractility

Clinical use:

- Alternative to beta-blockers in patients with intolerance
- Especially effective in vasospastic angina

Limitations:

- Can cause bradycardia, edema, constipation.

4. Antiplatelet Agents. Mechanism of action: These agents inhibit platelet aggregation, reducing the risk of arterial thrombus formation.

Examples:

- Aspirin (75–150 mg/day)
- Clopidogrel
- Ticagrelor

Indications:

- First-line treatment in all forms of ischemic heart disease
- Prevent stent thrombosis after PCI
- Reduces recurrence of myocardial infarction

Adverse effects:

- Gastrointestinal bleeding
- Hypersensitivity reactions

5. Anticoagulants. Mechanism of action: These drugs interfere with the coagulation cascade, preventing thrombus formation in high-risk patients.

Examples:

- Enoxaparin (low molecular weight heparin)
- Warfarin
- Rivaroxaban

Indications:

- Acute coronary syndrome
- Deep vein thrombosis or atrial fibrillation with coronary disease
- Monitoring required: INR for warfarin; coagulation profile for LMWH

Side effects:

- Bleeding complications
- Need for regular laboratory monitoring

6. Statins. Mechanism of action: Statins inhibit HMG-CoA reductase, reducing cholesterol synthesis in the liver and stabilizing atherosclerotic plaques.

Common agents:

- Atorvastatin
- Rosuvastatin
- Simvastatin

Clinical benefits:

- Reduces incidence of MI and stroke
- Improves endothelial function
- Provides long-term cardiovascular protection

Adverse effects:

- Myopathy, elevated liver enzymes

Clinical Considerations and Individualized Therapy. Therapeutic decisions must consider the patient's age, comorbidities (e.g., diabetes, chronic kidney disease), current medications, and risk of adverse effects. In many cases, combination therapy is necessary to achieve therapeutic goals. However, careful titration, monitoring, and patient education are crucial.

Regular assessments include:

- Blood pressure and heart rate monitoring
- Lipid profile
- Liver and kidney function tests
- ECG and echocardiography

CONCLUSION

Coronary insufficiency remains a critical health concern globally and in Uzbekistan. Pharmacological treatment plays a vital role in reducing symptoms, preventing complications, and improving patient survival. Understanding the specific properties of each class of medication and their appropriate use in various clinical scenarios ensures better outcomes. Comprehensive and

individualized pharmacotherapy under medical supervision forms the backbone of modern coronary disease management.

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