

# Research progress in drug therapy of coronary heart disease and angina pectoris

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**Abstract:** Coronary heart disease angina pectoris is a common symptom of coronary heart disease, which is mainly caused by patients' coronary artery hardening to varying degrees and abnormal blood flow, resulting in sudden intermittent sharp pain in the chest, which has a great impact on the life and health of patients. At present, there are many drugs for the treatment of coronary heart disease and angina pectoris. Western drugs include nitrates, calcium antagonists  $\beta$  Receptor blockers, statins. Traditional Chinese medicine includes drugs for removing blood stasis and excess, drugs for promoting blood circulation and tonifying deficiency, etc. The efficacy and indications of each drug are different. This paper reviews the literature on the drug treatment of coronary heart disease and angina pectoris.

**Keywords:** coronary heart disease, angina pectoris; medication; Curative effect; progress

## 1. Treatment with Western Medicine

### 1.1 Nitrates

Nitrates are commonly used western medicine for coronary heart disease. They can effectively treat the diseases caused by coronary atherosclerosis, and have a good control effect on the symptoms of angina pectoris in patients with coronary heart disease, especially reducing the number of angina pectoris. [1] Pharmacological studies have shown that nitrates can promote the effective expansion of patients' arteries and veins, fully reduce the compliance before and after the patient's heart, and thus reduce the patient's myocardial oxygen consumption, which can improve the condition of patients with coronary heart disease and angina pectoris. [2] According to clinical practice, isosorbide mononitrate sustained-release tablets have a significant effect on patients with angina pectoris, with a total effective rate of 96.0%. The number of angina pectoris attacks in patients is reduced from  $(5.8 \pm 0.4)$  to  $(1.3 \pm 0.6)$  times per week, the duration of angina pectoris is reduced from  $(4.8 \pm 0.7)$  min to  $(1.1 \pm 0.5)$  min, and the level of BNP is reduced from  $(324.5 \pm 15.6)$  ng / L to  $(65.4 \pm 8.5)$  ng / L. There were few adverse reactions during medication. [3] Nitrates can improve patients' ventricular remodeling at multiple levels, reduce the degree of coronary artery spasm, and inhibit platelets. Commonly used drugs in clinic include nitroglycerin, isosorbide mononitrate, isosorbide nitrate and so on. According to relevant studies, nitrates can prevent the oxidation of vascular endothelium in patients with coronary heart disease and angina pectoris, effectively reduce the clinical symptoms of patients, and effectively improve the prognosis of patients. [4]

### 1.2 Calcium Antagonist

Calcium antagonists are commonly used in the treatment of cardiovascular diseases. This drug can dilate the coronary artery and improve the symptoms of coronary artery spasm significantly. [5, 6] Pharmacological studies show that calcium antagonists can significantly improve myocardial hypoxia and ischemia and effectively alleviate the frequency of angina pectoris. After treatment, it can effectively block the calcium channel of patients with coronary heart disease and angina pectoris, play a role in the cell membrane of patients' myocardium and vascular smooth muscle, significantly inhibit the influx of extracellular calcium ions, significantly reduce the level of calcium ions in patients' cells, prevent cardiovascular abnormalities, and avoid large changes in the function of patients' tissues and organs. [7-9] Clinical practices show that [10] amlodipine tablets and benidipine tablets can treat the condition of patients with vasospasm angina pectoris. The total effective rates are 95.0% and 96.67% respectively. The incidence of adverse events such as limb edema and vasodilation is small. In patients treated with benidipine tablets, LVEDd decreased from  $(62.80 \pm 3.60)$  mm to  $(31.20 \pm 4.50)$  mm, LVEF

increased from  $(31.20 \pm 4.50)\%$  to  $(45.50 \pm 6.05)\%$ , and the number of ST segment down shift leads decreased from  $(4.80 \pm 1.33)$  to  $(1.96 \pm 0.50)$ , indicating that the level of cardiac function was significantly improved. <sup>[11]</sup> At present, nifedipine, nitrendipine, amlodipine besylate and amlodipine are the main calcium antagonists used in coronary heart disease and angina pectoris. In addition to blocking the calcium channel of patients, such drugs can also reduce the blood pressure level in patients, and significantly reduce the myocardial oxygen consumption of patients, so as to effectively reduce the cardiac afterload of patients. <sup>[12]</sup>

### **1.3 $\beta$ Receptor Blocker**

Commonly used in clinic  $\beta$  receptor blockers include bisoprolol, metoprolol and Betaloc. Clinical practices show that <sup>[13]</sup> betaloc combined with isosorbide mononitrate sustained-release tablets and metoprolol have a significant effect in the treatment of coronary heart disease and angina pectoris. The total effective rate of clinical treatment is 94.23%. The duration of each attack of angina pectoris is shortened from  $(6.62 \pm 1.09)$  min to  $(1.20 \pm 0.24)$  min, and the frequency of angina pectoris is reduced from  $(3.89 \pm 1.12)$  times to  $(0.41 \pm 0.10)$  times per day.  $\beta$  Receptor blockers can effectively dilate the coronary artery of patients with coronary heart disease and angina pectoris, so as to effectively improve the blood supply of the patient's heart, effectively prolong the diastolic period of the patient's heart, improve the blood supply time of the patient's heart, and significantly improve the myocardial hypoxia and ischemia of the patient. <sup>[14]</sup> Pharmacological studies show that <sup>[15]</sup>  $\beta$  receptor blockers can improve the myocardial contractility of patients, effectively alleviate the cardiac load of patients, and reduce the mortality and disability rate of patients with coronary heart disease and angina pectoris. According to clinical researches<sup>[16]</sup>,  $\beta$ receptor blocker combined with isosorbide mononitrate sustained-release tablets can fully improve the cardiac function of patients with coronary heart disease and angina pectoris. The LVESD of patients decreased from  $(42.35 \pm 2.63)$  mm to  $(31.04 \pm 3.75)$  mm, LVEF increased from  $(42.13 \pm 5.74) \%$  to  $(55.37 \pm 4.04)\%$  and LVEDd decreased from  $(61.24 \pm 3.56)$  mm to  $(50.17 \pm 3.60)$  mm.  $\beta$  receptor blockers can effectively improve the condition and cardiac function of patients with angina pectoris. If the patients have no obvious contraindications, they should be used. The effect of  $\beta$  receptor blockers is significant, which can significantly reduce the probability of emergencies. After medication, it can fully reduce various adverse symptoms of patients, including chest tightness and chest pain. <sup>[17]</sup>

### **1.4 Statins**

Statins are drugs that can regulate blood lipids and belong to 3-hydroxy-3-methylglutaryl CoA reductase inhibitors. They have a significant effect on reducing cholesterol in human body. At the same time, it can stabilize and reverse plaque, have obvious anti atherosclerotic effect, and effectively reduce the risk of adverse events in patients with cardiovascular disease. <sup>[18]</sup> Pharmacological studies suggested that <sup>[19]</sup> statins can significantly reduce the levels of cholesterol and very low density lipoprotein cholesterol in human serum, aorta, liver and other tissues and organs. At the same time, they have the effect of non-regulating blood lipid, can fully improve the vascular endothelial function of patients, and significantly inhibit the proliferation and advancement of vascular smooth muscle cells. Clinical practices show that<sup>[20]</sup> atorvastatin tablet has a significant effect on angina pectoris of coronary heart disease. The total effective rate of clinical treatment is 92.9%. The LDL-C of patients is reduced from  $(4.2 \pm 1.3)$  mmol / L to  $(2.6 \pm 1.3)$  mmol / L, HDL-C is reduced from  $(1.3 \pm 0.3)$  mmol / L to  $(1.63 \pm 0.5)$  mmol / L, TG is reduced from  $(3.1 \pm 1.5)$  mmol / L to  $(1.7 \pm 0.4)$  mmol / L, TC is reduced from  $(6.8 \pm 2.0)$  mmol / L to  $(4.8 \pm 0.4)$  mmol / L, indicating that the pain of patients is reduced, ECG waveform was significantly improved. Statins can significantly inhibit and stabilize the inflammatory response of coronary artery endothelial cells in patients with coronary heart disease and angina pectoris. After treatment, it has a strong competitive effect on hydroxymethylglutaryl CoA reductase receptor, which can reduce the level of hydroxymethylvaleric acid, block cholesterol synthesis, reduce cholesterol level, strengthen the stability of coronary atherosclerotic plaque, prevent the aggravation of vascular sclerosis, effectively improve the symptoms of angina pectoris and promote the effective stability of the patient's condition. <sup>[21]</sup>

## 2. Treatment with Chinese Medicine

### 2.1 Expelling Stasis and Removing Excess

Traditional Chinese medicine believes that angina pectoris of coronary heart disease belongs to the category of chest arthralgia. It believes that the patient's condition is due to the obstruction of heart pulse and stagnation of heart pulse. There is phlegm and stasis in the patient's body. Clinical treatment should pay attention to removing blood stasis and excess. Sodium tanshinone IIA sulfonate is a typical drug for promoting blood circulation and removing blood stasis. [22, 23] Traditional Chinese medicine believes that angina pectoris of coronary heart disease belongs to the category of chest arthralgia. It believes that the patient's condition is due to the obstruction of heart pulse and stagnation of heart pulse. There is phlegm and stasis in the patient's body. Clinical treatment should pay attention to removing blood stasis and excess. Sodium tanshinone IIA sulfonate is a typical drug for promoting blood circulation and removing blood stasis. [24, 25] Pharmacological studies show that sodium tanshinone IIA sulfonate has a good scavenging effect on oxygen free radicals, can resist the damage of oxygen free radicals to cells, has the effect of coronary artery dilation, effectively increases the blood flow of coronary artery, and can effectively improve the collateral circulation of myocardial tissue in the ischemic area of patients. [26] Clinical practices show that [27] sodium tanshinone IIA sulfonate can effectively improve the temporary ischemia and hypoxia of myocardium in patients with coronary heart disease and angina pectoris, and protect the myocardium. The total effective rate is 93.88%. Triglyceride is reduced from  $(2.76 \pm 0.48)$  mmol / L to  $(1.43 \pm 0.30)$  mmol / L, total cholesterol is reduced from  $(6.98 \pm 0.98)$  mmol / L to  $(4.29 \pm 0.71)$  mmol / L, and plasma viscosity is reduced from  $(2.68 \pm 0.68)$  MPa · s to  $(1.45 \pm 0.32)$  MPa · s, The whole blood viscosity decreased from  $(4.89 \pm 1.45)$  MPa · s to  $(2.97 \pm 0.85)$  MPa · s, the platelet adhesion rate decreased from  $(37.89 \pm 5.16)\%$  to  $(30.74 \pm 3.37)$ , and the fibrinogen decreased from  $(4.13 \pm 1.03)$  g / L to  $(3.04 \pm 0.78)$  g / L. Sodium tanshinone IIA sulfonate has a good correction effect on the metabolic disorder of cardiomyocytes in patients with coronary heart disease and angina pectoris, can resist platelet aggregation and prevent thrombosis, and can fully improve the hemorheology in vivo, which plays a positive role in the improvement of the condition of patients with angina pectoris. [28]

### 2.2 Promoting Blood Circulation and Tonifying Deficiency

Traditional Chinese medicine believes that patients with coronary heart disease and angina pectoris have weakness of heart, liver, spleen and other viscera, and the patient's blood gas is insufficient. Clinical treatment should pay attention to regulating Yang and supplementing Qi, promoting blood circulation and removing blood stasis. Heart stabilizing granule is a drug commonly used for Qi deficiency, yin deficiency, qi stagnation and blood stasis. It has a significant effect on the improvement of patients' condition such as panic and chest tightness. The drug is composed of Panax notoginseng, Codonopsis pilosula, rhizoma polygonati, amber and Glycyrrhiza, which can play a good role in supplementing Qi, nourishing Yin, activating blood circulation and removing blood stasis. According to clinical practice, the total effective rate of heart stabilizing granule combined with amlodipine tablets in the treatment of coronary heart disease and angina pectoris reached 92.0%, the index of cardiac function LVEDd decreased from  $(64.13 \pm 6.85)$  mm to  $(50.27 \pm 5.13)$  mm, LVEF increased from  $(40.13 \pm 4.57)\%$  to  $(55.96 \pm 5.71)\%$  and LVESD decreased from  $(56.33 \pm 5.69)$  mm to  $(40.35 \pm 4.82)$  mm. [29] Panax notoginseng in heart stabilizing granule can disperse blood stasis, stop bleeding, reduce swelling and pain, and can resist thrombosis, which plays a positive role in improving the disorder of cardiovascular system. Pharmacological studies show that [30] saponins, flavonoids and other components in Panax notoginseng can have anti-inflammatory and anti-inflammatory effects, and have good liver protection and analgesic effects. Codonopsis pilosula, polygonatum and other traditional Chinese medicine can replenish zhongyiqi, strengthen spleen and lungs, amber can calm and activate blood circulation, succinic acid can have the effect of relieving cough and expectorant, reducing blood lipid and resisting arteriosclerosis.

## 3. Conclusions

The clinical treatment of coronary heart disease and angina pectoris is mainly to use drugs to improve the patient's coronary artery blood flow state, make the patient's heart obtain enough blood and oxygen, reduce the clinical symptoms caused by cardiac ischemia and hypoxia, effectively stabilize the patient's condition and avoid coronary heart disease endangering the patient's life safety. In the

future, we should pay attention to the further deepening of the research on traditional Chinese medicine, explore an effective and safe scheme of integrated traditional Chinese and Western medicine, and effectively improve the prognosis of patients.

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