

Clinical study on treatment of chronic heart failure with Chinese and Western medicine

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Abstract: Chronic heart failure is a common disease in the middle and old age, its morbidity and mortality increase year by year, and its high rate of re-hospitalization seriously affects the quality of life of patients. In recent years, the understanding and treatment of chronic heart failure in Chinese medicine and Western medicine have been deepening, and they have been trying to apply new treatment methods, and have achieved good clinical effect. Traditional Chinese medicine improves patients' symptoms and delays the progression of the disease through syndrome differentiation and classification, while Western medicine extends patients' life expectancy by adopting a variety of treatments for the disease. This article summarizes the latest research progress of Chinese and Western medicine treatment of chronic heart failure.

Chronic heart failure (CHF) is a serious life-threatening clinical syndrome with high morbidity, mortality and readmission rate. Currently, approximately 40% of total deaths worldwide are attributed to cardiovascular disease, which is the "number one killer" claiming more than 17 million lives each year ^[1]. Chronic heart failure (CHF) refers to a group of complex clinical syndromes caused by abnormal changes in the structure and function of the heart caused by various reasons, resulting in the disturbance of ventricular contraction and/or filling, the decrease of cardiac output during rest or exercise, or the increase of pressure in the heart cavity. The main manifestations are reduced activity tolerance (dyspnea, fatigue) and fluid retention (pulmonary congestion, systemic congestion and peripheral edema). Due to an aging population and increasing life expectancy, the prevalence of CHF is increasing year by year. Despite the continuous improvement of TCM and Western medicine treatment regimens at CHF, the long-term prognosis of patients is still poor. In recent years, Chinese medicine has an ideal therapeutic effect on CHF patients, and the therapeutic effect of integrated Chinese and Western medicine is better than that of Western medicine alone. This article reviews the research progress of Chinese and western medicine treatment for CHF.

1. Chinese medicine treatment of CHF

1.1 Etiology and pathogenesis

China's traditional medicine does not clearly put forward the name of "heart failure", but many literature according to the symptoms of this disease, often ascribe it to the "heart Bi", "asthmatic syndrome" and "edema" related categories, the earliest "Suq · regulating classics" has a description of heart failure: water and qi against the lungs, so that people can not lie down, lying down is asthmatic. The name of "heart failure" was clearly put forward in Wang Shuhe's "Pulse Classic · Spleen and Stomach Disease", saying that "heart failure leads to depression and liver depression", and the etiology and pathogenesis of heart failure was also discussed as early as "Huangdi Neijing". The incidence of heart failure was mostly caused by factors such as prolonged illness injury, external feelings, and emotional injury, which made it difficult to promote warm blood running in the vein and blood stasis in the heart. The blood stasis forces the blood to leak out, resulting in the internal stop of water and blood stasis, and the interaction of water and blood stasis, resulting in heart failure. Therefore, deficiency of heart qi and deficiency of heart Yang are the fundamental pathogenesis of heart failure, while blood stasis is the central pathological link, phlegm turbidness and water drink are the main pathological products, so the pathogenesis of CHF can be summarized with "deficiency", "phlegm" and "blood stasis". The main pathogenesis of CHF is deficiency of essence and deficiency of essence, deficiency of heart qi and Yang, deficiency of essence is stasis of blood and water, and the main location of CHF is heart. We should follow the treatment principles of traditional Chinese medicine, and correct the pathogenesis of CHF by warming heart-qi and heart-yang, promoting blood circulation and removing blood stasis, reducing edema and taking into account Yin and fluid, so as to improve its symptoms.

1.2 Heal

1.2.1 Traditional Chinese medicine decoction

Treatment of chronic heart failure with modified Yanghe Decoction: Qu Zhengyan et al.^[2] divided 40 patients with chronic heart failure into observation group and control group. The control group was treated with conventional Western medicine, and the observation group was treated with modified Yanghe Decoction on the basis of the control group, and found that the levels of heart, liver, kidney, functional indexes, symptom scores and inflammatory factors in the observation group were better than those in the control group. Yao Shengqing^[3] divided 60 patients with chronic heart failure into observation group and control group. The control group was treated with Xinbao Pill, and the observation group was treated with epheduang Fuzi Xianxin Decoction and Yang Decoction, and found that the clinical efficacy of the observation group was significantly better than that of the control group. Chen Dalei et al.^[4] randomly divided 60 patients with chronic heart failure into the treatment group and the control group. The treatment group was given Yanghe Tang modified prescription and the control group was given Xinbao pill, and found that the total effective rate of the treatment group was higher than that of the control group. Yanghe Decoction formula and function: Yanghe Decoction is derived from Wang Hongxu's "Surgical Syndrome Treatment of Whole health collection", the formula is cooked Rehmannia 20g, antler gum 9g, ginseng 9g, grilled ephedra 2g, cinnamon 3g, dried ginger 3g, white mustard seed 6g, Salvia miltiorrhiza 30g, Delong 9g, Tuckaia 30g, licorice 6g. Ripe Dihuang can benefit the kidney to fill essence, nourishing the liver and kidney, deer horn gum can warm the liver and kidney, benefit the essence and blood, a total of Jun medicine, dried ginger good into the blood, warm the cold, back to Yang Tong pulse, cinnamon dispel cold, regulate the qi to relieve pain, help Yang dispel cold, and dried ginger, both

warm the meridian, and break Yin back to Yang. Ephedra, white mustard seeds, dried ginger, cinnamon combined to restrict the cooked rehmannia, deer horn glue greasy, fill without stagnation, a total of minister medicine. Ginseng supplementing Qi, salvia miltiorrhiza and dulong promoting blood circulation and removing blood stasis are common adjuvants; Raw licorice mixed with herbs. This prescription plays the role of filling and nourishing qi, warming Yang and clearing collaterals, warming liver and kidney, and nourishing blood. For chronic heart failure, it can cure the root cause and clear collaterals.

Modern pharmacological studies have shown that Yanghe Decoction has the effects of strengthening heart, diuresis, dilating blood vessels, inhibiting platelet aggregation, increasing white blood cells and inhibiting bacteria. The chemical components of cooked Rehmannia mainly include catalpa, rehmanitol, mannitol, vitamin A substances, sugars and amino acids, etc. Its alcohol extract can promote red blood cell regeneration, increase bone marrow nucleated cells, whole blood cells and peripheral white blood cells, reduce blood glucose value and liver glucose-6-phosphatase activity, and increase plasma insulin level. The main chemical components of antler gum are animal protein, a variety of amino acids, peptides, hormones, sugars and a few trace elements. It has anti-inflammatory, analgesic, blood-activating and aphrodisiac effects. The main chemical components of ephedra are alkaloids, polysaccharides, volatile oils, organic acids, tannins, ketones, etc., which can relieve heat and sweat, relax smooth muscle, diuretic, reduce urinary protein, relieve water and detumescence, reduce inflammatory response, remove oxygen free radicals, antioxidant, etc. Dried ginger has a hemostatic effect. The main chemical components of cinnamon are cinnamic aldehyde, carbohydrate, polyphenols, flavonoids, etc. Cinnamic aldehyde has the function of vasodilating, improving myocardial blood supply and anti-shock, and the hot water extract of cinnamon can resist oxidation, anti-aging, inhibit inflammation and arteriosclerosis. The main chemical components of white mustard include polysaccharide, volatile oil, fatty acid, alkaloid and flavone, which have the functions of relieving cough, relieving asthma and expelling phlegm, anti-inflammatory and analgesic, inhibiting prostatic hyperplasia, correcting oxygen free radical metabolism disorder and promoting transdermal absorption. The chemical components of glycyrrhiza mainly include flavonoids, coumarins, triterpenoid saponins and triterpenoid aglycosides, etc., which have antiviral, anti-inflammatory, immune regulation, anti-arrhythmia, and cardiovascular and cerebrovascular protection effects^[5-6].

1.2.2 Chinese patent medicine

A study on the treatment of CHF with Qishenyiqi dropping pills combined with Shakubatrly valsartan found that the combination of the two could inhibit myocardial remodeling, improve vascular endothelial function, and improve the quality of life of CHF patients, with good therapeutic safety^[7]. Qiliqiangxin Capsule is a kind of traditional Chinese medicine preparation. Li Xinli^[8] used Qiliqiangxin capsule in combination with conventional western medicine to treat CHF patients. After 12 weeks' follow-up review, it was found that the plasma NT-proBNP level of patients in the Qiliqiangxin capsule group was more significantly reduced^[9].

Quick-acting rescue pill is widely used in the treatment of coronary heart disease in China. Its main components are Chuanxiong and borneol, which can improve myocardial hemodynamics and energy metabolism, reduce the degree and scope of myocardial ischemia, and significantly relieve the symptoms of angina pectoris. Recent studies have shown that quick-acting heart-saving pills also have certain effects on ion channels. Zhang et al. found in Chinese hamster ovarian cells that fast-acting Jixin Pill could significantly inhibit the human clone potassium channel (hKv1.5) current in a time, dose and voltage dependent manner, but had no significant effect on the steady-state activation curve, activation time constant and inactivation time constant.

There are many proprietary Chinese medicines for the treatment of arrhythmia, but the

electrophysiological mechanism of some important proprietary Chinese medicines is still lacking. In addition to the above-mentioned drugs, domestic scholars have also explored the clinical effects of other different proprietary Chinese medicines on arrhythmia. In most studies, Yangxindingpalpitum granules are often used to control the ventricular rate of patients with tachyarrhythmia, and the therapeutic effect on patients with ventricular precontraction is reasonable. Ershen Fumai capsules and Xinbao pills are more commonly used for slow arrhythmias, such as sinus bradycardia and sick sinus syndrome. Qiliqiangxin capsule can be used for the treatment of patients with chronic heart failure complicated with atrial fibrillation. But these findings require more evidence-based medical evidence.

Proprietary Chinese medicines are made up of a variety of herbs, each of which has a different effect. Herbs such as Coptis, scutellaria baicalensis and pine can usually inhibit tachyarrhythmia, while aconite, ginseng, cinnamon bark and Reishi can increase the heart rate of patients with bradycardia. Therefore, proprietary Chinese medicines containing such herbs may have similar anti-arrhythmic effects, while proprietary Chinese medicines containing multiple active ingredients may show different effects in different types of arrhythmias. For example, Shensong Yangxin capsule can effectively reduce the ventricular precontraction of patients, but can also increase the heart rate of patients with sick sinus syndrome or atrioventricular block.

1.2.3 Chinese medicine injection

Ruan Jing^[10]discussed the efficacy of Danshen Chuanxiustrazine injection combined with recombinant human brain natriuretic peptide in the treatment of CHF through randomized control method. After comprehensive analysis, the clinical efficacy of this drug was relatively ideal, which could alleviate the clinical symptoms of patients and strengthen the cardiovascular effect. In a study comparing the efficacy of Shenmai injection combined with bisoprolol in treating 86 cases of senile CHF with conventional western medicine, it was found that the clinical effective rate of Shenmai injection combined with bisoprolol was significantly better than that of the control group (93.02%vs.76.71%, $P<0.05$), and LVEF was higher than that of the control group^[11]. In another randomized controlled experiment using Shenmai injection to treat heart failure with Qi-Yin deficiency syndrome, it was also confirmed that the drug can effectively tonify the heart and nourish Yin and Qi, and improve symptoms.

2. Western medicine treatment at CHF

In recent decades, the treatment strategy of heart failure has changed from the initial "strong heart, diuretic, vasodilator", to the neurohormone inhibition therapy based on β -blockers and ACEI, and then to the standard "golden triangle" treatment program after the addition of aldosterone receptor antagonists, although this program has reduced the incidence and mortality of heart failure to a certain extent. However, there are still problems such as poor prognosis and repeated hospitalization. In recent years, some researchers have made new discoveries based on the previous mechanisms and made new breakthroughs in the treatment of CHF.

2.1 sGC agonist

sGC agonist vericiguat is a soluble guanylate cyclase (sGC) agonist, which directly stimulates sGC to restore the function of the key signaling pathway (NO-sGC-cGMP), reduces myocardial and vascular sclerosis, myocardial fibrosis, and reduces the damage to the heart and blood vessels. In the Phase III VICTORIA clinical study in the HFrEF population^[12], combined with vericiguat on the basis of adequate standard treatment, the absolute risk of primary endpoint events was reduced

by 4.2%, and the rate of re-hospitalization for heart failure was lower than that in the placebo group (27.4%vs.29.6%), with significant clinical significance. Analysis of studies presented at the 2021 ESC Annual Meeting further confirmed the safety and efficacy of vericiguat, and subsequently the 2022 AHA/ACC Heart Failure Guidelines included vericiguat as a novel mechanistic agent and recommended for the treatment of high-risk HFrEF.

2.2 SGLT2i

Sodium - dependentglucosetransporters2inhibitor SGLT2i column net class of drugs, including the common Glenn and Glenn net, net is a kind of new diabetes drugs. However in DAPA - HF experiment and EMPEROR - Reduced, when reduce the SGLT2i added to the ejection fraction of patients with heart failure (Heart failure with reduced ejection fraction HFrEF) standard treatment. It can reduce the risk of cardiovascular death and hospitalization for heart failure by 25% and is not associated with diabetic status^[13-17]. In patients with HFrEF, significant and sustained statistical benefits were seen very early on in the randomization group, with a slower decline in renal function compared to placebo and improved survival, regardless of baseline renal function. In a double-blind trial involving 5988 patients with CHF, the rate of cardiovascular death or hospitalization for heart failure and the total number of hospitalizations for heart failure were lower in the group receiving englaglitzin in addition to usual care than in the placebo group ($P<0.001$). The 2021 European Society of Cardiology (ESC) Guidelines for the Management of Heart Failure add SGLT2i to the standard "Golden Triangle" protocol, making it the "new quadruple" standard treatment. Subsequently, the ACC/AHA/HFSA heart Failure Guidelines released in 2022 also made Class 2a recommendations for SGLT2i, which is superior to other drugs, and it has become the only drug that can cover the whole management of heart failure from prevention to treatment. With the approval of Engliglizin for HFrEF indication in China, SGLT2i will be used as the core treatment drug for CHF, bringing hope for further reducing the burden of heart failure patients in China and meeting clinical needs.

3. Summary

Chronic heart failure is a complex and terminal stage of cardiovascular disease, with a high rate of readmission. Western medicine alone has no obvious effect on improving the quality of life and prognosis of patients with chronic heart failure. On the basis of Western medicine treatment, the addition of traditional Chinese medicine decoction, proprietary Chinese medicine and traditional Chinese medicine injection has a good effect on CHF patients. It is expected that the clinical application of modern test methods can evaluate the clinical mechanism of TCM treatment of CHF more scientifically and objectively, obtain clear evidence-based medical evidence, and promote the scientific and standardized application of TCM in the treatment of CHF.

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