

Research progress on the prevention and treatment of chronic heart failure with integrated traditional Chinese and Western medicine

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Abstract: Chronic heart failure (CHF) is a persistent state of heart failure, which is the severe and terminal stage of the development of a variety of heart diseases. It is particularly important to explore how to treat chronic heart failure more effectively, because of its severe disease, long course of disease, high mortality rate, reduced quality of life, and poor prognosis. In the collation of relevant literature on chronic heart failure, it was found that the combination of traditional Chinese and Western medicine has a good clinical effect. This article takes the combination of traditional Chinese and Western medicine in the treatment of chronic heart failure as the starting point, discusses its research progress, and provides more treatment methods and ideas for the clinical prevention and treatment of chronic heart failure.

1. Introduction

Chronic heart failure (CHF) is a slow progression of various diseases that cause structural or functional abnormalities of the heart, which can be stable, worsen, and decompensated, and is the severe and terminal stage of the development of various heart diseases ^[1]. Modern medical research has found that CHF has become one of the diseases that seriously threatens human life and health ^[2]. According to the China Cardiovascular Health and Disease Report 2022 ^[3], 8.9 million of the 330 million patients with cardiovascular diseases are suffering from heart failure, with severe disease, long disease duration, high mortality rate, reduced quality of life, and poor prognosis. In developed countries, healthcare costs associated with the treatment of heart failure are expected to increase by more than 200 percent over the next 20 years ^[4]. According to the data of multi-center clinical studies in China, the direct medical consumption related to heart failure exceeds 35 billion yuan, accounting for 5% of the total national health care expenditure ^[5]. Therefore, it is particularly important to comprehensively explore the etiology, pathogenesis, prevention and treatment of chronic heart failure, and it is found that the combination of traditional Chinese and Western

medicine in the treatment of chronic heart failure has a good clinical effect. The research progress of integrated traditional Chinese and Western medicine in the prevention and treatment of chronic heart failure is summarized as follows.

2. CHF's Western Medical Understanding

2.1 Pathogenesis of CHF

Chronic heart failure (CHF) is a serious consequence of heart disease that affects the heart's pumping function, causing blood and fluid to build up in the body. It is a complex process involving multiple factors, involving multiple links such as changes in cardiac structure, abnormal neurohumoral regulation, myocardial metabolic disorders, and myocardial cell death. It affects the heart's pumping function, causing blood and fluid to build up in the body.

In CHF, the structure of the heart undergoes significant changes, including hypertrophy and fibrosis of cardiomyocytes. These structural changes cause the heart muscle to thicken, heart chambers to enlarge, and the heart's ability to pump blood to decrease. An imbalance occurs in the heart's neurohumoral regulatory system, resulting in the release of excess neurohormones (eg, renin-angiotensin-aldosterone system) and cytokines (eg, tumor necrosis factor- α and interleukin-1 β). These substances directly affect heart function and promote the damage and death of heart muscle cells. The energy metabolism of cardiomyocytes is also affected in CHF, and metabolic disorders occur. These include problems such as mitochondrial dysfunction, decreased energy production, and lactate buildup, all of which can affect the heart's contractility and endurance.

2.2 Western medicine treatment of CHF

The treatment of CHF in modern medicine can be divided into general treatment, drug treatment and non-drug treatment. At present, drug therapy is one of the most common methods in the treatment of CHF at home and abroad. The 2022 Guidelines for the Diagnosis and Treatment of Acute and Chronic Heart Failure (ESC) [6] pointed out that the treatment regimen for heart failure will be changed from the "golden triangle" of "cardiotonics, diuresis, and vasodilation" to "new quadruple". In recent years, there have been new breakthroughs in the traditional treatment of CHF.

2.2.1 Angiotensin receptor neprilysin inhibition (ARNI)

Representative drugs include sacubitril-valsartan sodium tablets. Studies have shown [7] that sacubitril-valsartan can improve the clinical efficacy of heart failure in elderly patients with reduced ejection fraction compared with enalapril, and the safety profile is comparable. Huo Jiaqi et al. [8] divided 208 patients with chronic heart failure into groups, and the experimental group was given sacubitril-valsartan sodium tablets, and the control group was given irbesartan tablets, and the results of left ventricular ejection fraction and cardiac output in the experimental group were higher than those in the control group ($P < 0.05$). During the follow-up period, the recurrence rate of patients in the experimental group was lower than that in the control group ($P < 0.05$). For the treatment of chronic heart failure, sacubitril-valsartan sodium has been found to improve cardiac function and enhance patients' exercise tolerance, thereby reducing the rate of recurrence and rehospitalization. Moreover, for patients with end-stage renal disease and heart failure, angiotensin receptor neprilysin inhibition has a better therapeutic effect. Ji Like et al. [9] selected 63 patients with end-stage renal disease complicated with heart failure as the research object, and found that sacubitril-valsartan can effectively improve ventricular function and reverse ventricular remodeling

in such patients, thereby improving cardiac function and lowering blood pressure, and has a good safety profile.

2.2.2 Sodium-glucose cotransporter 2 inhibitors (SGLT2i)

SGLT2i are a new type of hypoglycemic drugs, including empagliflozin and dapagliflozin. It is a new drug for the treatment of type 2 diabetes, but it has been found to have a certain effect on cardiovascular disease while lowering blood sugar^[10]. SGLT2i has been found to reduce the risk of HF hospitalization by 31%^[11], and this reduction has been found to be the same in patients with no history of atherosclerotic disease or heart failure. Zhang Ban^[12] conducted a meta-analysis of the efficacy and safety of SGLT2 inhibitors in the treatment of heart failure with preserved ejection fraction, and found that SGLT2i can effectively reduce the incidence of heart failure hospitalization and cardiovascular composite events in patients with HFpEF, and can also improve cardiac function and reduce the incidence of serious adverse events in patients with HFpEF. SGLT2i, as a new quadruple drug for the treatment of heart failure, effectively reduces the mortality rate and rehospitalization rate of patients.

2.2.3 Soluble guanylate cyclase (sGC) activators

Vericiguat is a representative drug, which has been shown to shorten hospital stay in patients with heart failure with reduced ejection fraction^[13]. sGC activators can directly intervene in cell-signaling mechanism disorders and repair the NO-sGC-cGMP pathway, so they can be used as new anti-heart failure drugs. Jia et al.^[14] used a network meta-analysis to compare the efficacy and safety of novel oral soluble guanylate cyclase (sGC) agonists in the treatment of heart failure (HF). Randomized controlled studies (RCTs) related to sGC agonists in the treatment of heart failure were searched in the database, and it was finally found that among the sGC agonists, vericiguat 10 mg d-1 was the best treatment for heart failure, and the safety profile of all sGC agonists was good. It provides a new treatment option for patients with heart failure to improve their life expectancy and quality of life.

2.3 Non-pharmacological treatments

Cardiac resynchronization therapy (CRT), implantable cardioverter-defibrillator (ICD), left ventricular assist device (LVAD), heart transplantation, etc. These treatments can improve the heart's pumping function and improve the patient's quality of life. In addition to drug and non-drug treatments, there are also some new treatments, such as gene therapy, cell therapy, etc. All of them provide new possibilities for the treatment of CHF.

3. TCM understanding of CHF

3.1 Etiology and pathogenesis of CHF

Traditional Chinese medicine is often named after symptoms, so according to the symptoms and signs, it can be classified into the categories of diseases such as "edema", "phlegm drinking", "cough", "wheezing", "chest paralysis", "heart water", "palpitations" and so on. The understanding of the etiology and pathogenesis of this disease is not the same, and each has its own emphasis. Traditional Chinese medicine^[15] believes that heart failure is mainly caused by different causes of damage to the heart's qi, blood, yin and yang, and the inability to promote blood circulation to nourish the body, resulting in dysfunction or failure of the internal organs. Zhou Zhongying, a master of traditional Chinese medicine^[16], believes that the pathogenesis of heart failure is

characterized by the deficiency of qi (yang) and stasis, and the heart and lungs are offended by drinking water. Academician Chen Keji ^[17] believes that heart failure is caused by the qi of the heart, yang deficiency, blood stasis, water drinking, phlegm drinking, etc. as pathological products, so its pathogenesis is summarized as "deficiency", "stasis" and "water". Professor Li Xiangzhong ^[18] believes that the pathological basis of heart failure is yang deficiency, yin deficiency and qi deficiency, the pathological link is blood stasis, and the pathological products are water dampness and phlegm drinking. The research on the pathogenesis of chronic heart failure by various doctors shows that the main pathogenesis of this disease is that the deficiency is the reality and the deficiency. The disease site involves the heart, kidneys, lungs, and spleen; Pathological factors are mostly phlegm drinking, water stoppage, blood stasis, etc. In the treatment, commonly used traditional Chinese medicines include astragalus, ginseng, atractylodes, angelica and other drugs that nourish qi and nourish blood, as well as salvia, Chuanxiong, peach kernel, safflower and other drugs that invigorate blood and dispel blood stasis. These drugs can improve myocardial ischemia and reduce the burden on the heart, thereby relieving symptoms and improving the quality of life of patients.

Traditional Chinese medicine has a long history, and it is basically based on the ancient books and famous prescriptions, and the clinical experience is divided into the empirical prescriptions of each family, and the clinical effect is good. The 2018 Guidelines for the Diagnosis and Treatment of Heart Failure in China (2018) ^[19] clarified that proprietary Chinese medicines have certain clinical efficacy in the treatment of CHF. In addition, well-known experts in China have also formulated the Expert Consensus on the Diagnosis and Treatment of Chronic eart Failure with Traditional Chinese Medicine ^[20] and the Expert Consensus on the Diagnosis and Treatment of Chronic Heart Failure with Integrated Traditional Chinese and Western Medicine ^[21] for the reference of clinicians. Therefore, the treatment of CHF with both traditional Chinese medicine and Western medicine can achieve better comprehensive effects and give better play to the advantages of both.

3.2 TCM treatment of CHF

3.2.1 Traditional Chinese Medicine Compound Preparations

According to the 2021 Guidelines for the Clinical Application of Proprietary Chinese Medicines in the Treatment of Heart Failure ^[22], the commonly used drugs for the treatment of heart failure include 5 kinds of Chinese patent medicines and 6 kinds of intravenous preparations, including Shenfu Qiangxin Pills, Qili Qiangxin Capsules, Buyi Qiangxin Tablets, Shenfu Injection, Yiqi Fumai (freeze-dried), and Astragalus Injection. Pan et al. ^[23] conducted a network meta-analysis of the efficacy of traditional Chinese medicine injections in the treatment of heart failure with preserved ejection fraction. The results showed that for patients with HFpEF, traditional Chinese medicine injection combined with conventional treatment could further effectively improve the clinical symptoms and left ventricular diastolic function with fewer adverse reactions. Li Zhichao et al. ^[24] found that 60 patients with coronary heart disease and heart failure found that Shenfu injection effectively reduced inflammatory factors and BNP levels in patients with heart failure, thereby improving cardiac function.

3.2.2 Traditional Chinese medicine decoction

Zheng Meihua ^[25] selected 100 patients with qi and yin deficiency syndrome to observe the clinical effect of Shengmaisan combined with sacubitril valsartan sodium tablets in the treatment of chronic heart failure with decreased ejection fraction of qi and yin deficiency syndrome, and concluded that the efficacy of the treatment group was better than that of the control group, and the

incidence of adverse events was lower than that of the control group ($P < 0.05$). Therefore, the clinical efficacy of Shengmaisan in the treatment of qi and yin deficiency heart failure is good, and the heart function is significantly improved. The improvement in cardiac function was more pronounced. Kang Tanghui^[26] investigated the clinical efficacy of Zhenwu Tanghe Wuling San in the treatment of Yang-deficiency water-generic heart failure in 64 patients with Yang-deficiency-water generalized heart failure. The control group was given conventional Western medicine treatment, and the observation group was given Zhenwu Tang and Wuling San on the basis of the basis again. The study showed that Zhenwu Tang and Wuling San had a significant effect in the treatment of Yang deficiency and water generalized heart failure, improving cardiac function and prognosis, thereby improving their quality of life.

3.2.3 Other treatments

In addition to medication, TCM also emphasizes emotional regulation, dietary regulation and lifestyle adjustment. By improving the patient's emotional state, adjusting the diet and changing the lifestyle, it can help the patient better cope with chronic heart failure. Clinical studies have also found^[27] that acupuncture of Neiguan acupoint can significantly improve cardiac function and quality of life in patients with congestive heart failure.

4. Conclusion

In clinical practice, patients with chronic heart failure are more common, and their disease is severe, the course of the disease is long, the mortality rate is high, the quality of life is reduced, and the prognosis is poor. However, conventional traditional drug treatment has certain limitations, toxic side effects and other adverse reactions, so the search for efficient therapeutic drugs has become a hot spot in clinical research in recent years. In recent years, traditional Chinese medicine has made great progress in the prevention and treatment of heart failure. It has also achieved good therapeutic results in combination with Western medicine, which is a breakthrough in the prevention and treatment of heart failure diseases. Therefore, we need to integrate traditional Chinese medicine and Western medicine to prevent and treat chronic heart failure, and I believe that in the near future, we will achieve better results in the treatment of heart failure. Better play the advantages of both.

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