

# Treatment of Chronic Heart Failure Complicated with Anxiety and Depression Using Traditional Chinese and Western Medicine

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**Abstract:** Chronic heart failure (CHF) is the terminal stage of various heart diseases, and is the main cause of death from cardiovascular disease. In recent years, the prevalence of CHF combined with anxiety and depressive state has shown an upward trend, and this paper was aimed to provide a reference for the diagnosis and treatment of CHF combined with anxiety and depression using Traditional Chinese medicine (TCM) and Western medicine.

**Keywords:** Chronic heart failure; Anxiety; Depression; TCM therapy; Western medicine therapy

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## 1. Introduction

Chronic heart failure (CHF) refers to the gradual appearance of symptoms and signs, such as dyspnea, fatigue, and fluid retention (pulmonary congestion, circulatory congestion, and peripheral edema) on the basis of the original chronic heart disease, which is a slow progression process, and generally accompanied with the participation of compensatory cardiac enlargement or hypertrophy, and other cardiac compensation mechanisms<sup>[1]</sup>. Due to the recurrence of the disease, the long course of the disease, and the need for long-term medication, this may lead to increase the pressure on the patient's mental and economic level, subsequently may result in negative emotions, such as anxiety and depression, which in return may influence the efficacy and prognosis of the disease. In recent years, the incidence of CHF combined with anxiety-depressive states have been higher, and studies have shown that about 21.6% of patients with CHF have severe depression which is approximately 2 to 3 times higher, compared to the general population. In addition, approximately 24.2% and 26.2% of patients with heart failure suffer from depression and anxiety, respectively, showing a much higher incidence compared to non-heart failure patients<sup>[2]</sup>.

## 2. Research progress on the pathological mechanism of Traditional Chinese and Western medicine

### 2.1. Pathogenesis of Traditional Chinese Medicine (TCM)

In Chinese medicine, there is no specific name or term of CHF, where CHF is considered to belong to the category of "heart paralysis, palpitations, edema" and other categories. The main pathogens for this disease are qi, water drinking, and blood stasis, which may lead to poor operation of qi and blood, causing qi deficiency<sup>[3]</sup>. Anxiety and depression belong to the category of "depression evidence" in Chinese medicine, and the main disease mechanism is contributed by the seven emotions, the emotional failure, or the anger

which may hurt the liver, resulting in liver qi depression and illness <sup>[4]</sup>. The heart, “as the official of the monarch, the god out of the way,” can command the qi of the internal organs, which dominate all the mental activities of the person, therefore the lesions of the heart are often accompanied by the lesions of the emotions. The Great Treatise on the Six Yuan Zheng Ji (Su Qing, The Great Treatise of the Six Yuan Zheng Ji) mentioned that; “If the heart is weak, the mind is shaken, and it is easy to be afraid and frightened;” “Lingshu Evil Qi Tibetan House Disease Form” Cloud; “Sorrow and fear are sad,” “Danxi Heart Law Six Yu” Cloud; “Qi and blood rush harmonious, all diseases do not give birth, once there is depression, all diseases are born, so people are sick, many are born of Depression.” It can be seen that CHF often combines with anxiety and depressive disorders, and when these two disorders are combined, they always damaged by the form and God, mainly due to the injury of the heart pulse and the misuse of the divine machine <sup>[5]</sup>. In addition, long-term emotional depression leading to liver damage, maternal disease and child, at the same time it can also aggravate the patient’s heart failure.

## **2.2. Pathogenesis of Western medicine**

### **2.2.1. Mechanisms of neurosomal humoral regulation**

Patients with heart failure have a decrease in the amount of blood exuded from the heart, insufficient blood supply to tissues and organs, and the body is in a long-term state of “chronic stress,” resulting in hyperfunction of the hypothalamic-pituitary-adrenal axis (HPA), and a large release of adrenocorticotropes and cortisol, which can affect the emotional regulation center of the brain for a long time when these hormones are maintained at high levels, thereby inducing anxiety and depression disorder <sup>[6]</sup>.

### **2.2.2. Autonomic regulatory mechanisms**

Patients with heart failure are often accompanied by sympathetic excitement, resulting in increased peripheral catecholamine secretion, and the release of a large number of catecholamines which can easily lead to autonomic dysfunction, causing neurotransmitter secretion disorders, such as norepinephrine and serotonin in the central nervous system, leading to mood disorders <sup>[7]</sup>. Sessa et al., <sup>[8]</sup> in his studies found that patients with CHF have autonomic dysfunction and decreased heart rate variability (HRV), additionally the degree of HRV reduction is positively correlated with the severity of CHF, where the patients with depression also have autonomic nervous system dysfunction and decreased HRV, and the degree of HRV reduction is inversely correlated with the severity of depression <sup>[9]</sup>. Other studies have also shown that the decline in HRV in patients with CHF comorbidities with depression is more pronounced, than in patients with depression alone or CHF alone, indicating that the comorbidities of the two have a synergistic effect on the reduction of HRV <sup>[10]</sup>. In summary, autonomic nervous system dysfunction, especially HRV changes, play an important role in CHF and depression, however the mechanism that linking these conditions is still unclear.

### **2.2.3. Immune-related mechanisms**

In patients with heart failure, cytokines, such as tumor necrosis factor- $\alpha$  (TNF-  $\alpha$ ), interleukin (IL)-1, IL-6, and inflammatory mediators increased significantly <sup>[10]</sup>, and study found that the content of IL-6 and IL-1 in anxious and depressed patients was higher, compared to normal people, and it was confirmed to be related to stress and emotions <sup>[11]</sup>. Studies have also shown that CHF patients also have an imbalance in the level of pro-inflammatory and anti-inflammatory factors, which are manifested by the increased levels of plasma pro-inflammatory factors, such as IL-1 $\beta$ , IL-6, IL-8, IL-10, IL-13, IL-17, IL-18, and others.

#### **2.2.4. Psychosocial related mechanisms**

A survey found that people with low education and weak in will power are prone to anxiety and depression [12], and the incidence of depressive disorder is more than twice in female patients with heart failure than men [13]. From a personal point of view, heart failure can lead to a decline in activity tolerance, such as patients could not tolerate heavy physical labor, or even some patients could not take care of themselves, and their social function may become limited, therefore lacking of family, friends, and social care may easily contribute to depression in the patients [14]. In addition, from a social point of view, heart failure patients have to bear the heavy burden of long treatment process, high medical costs, thereby the patient's psychological burden become too heavy, subsequently, may contribute to the development of anxiety, depression, and negative emotions in patients.

### **3. Progress in traditional Chinese and Western medicine treatment**

#### **3.1. Western medicine treatment**

There is specific medication that is prescribed for the heart patients, such as Selective serotonin reuptake inhibitors (SSRIs); Sertraline, fluoxetine, tricyclic, and tetracyclic; Antidepressants: Imipramine; Monoamine oxidase inhibitors: Moclobemide, serotonin antagonists; and Reuptake inhibitors (SARIs): Trazodone; and Selective norepinephrine reuptake agents (NRIs): Reboxetine. The SSRIs anti-anxiety depressants protect ventricular function and the heart conduction system; therefore, they have become the first-line antidepressants of choice for cardiovascular patients [15].

#### **3.2. Traditional Chinese medicine treatment**

##### **3.2.1 Hepatic depressive method**

Liao Zhishan [16] and others through conducting research, where the control group is given a conventional Western medical treatment, and the treatment group was given Western medical treatment combined with Chai Hu loose liver scatter treatment, where the Chai Hu loose liver powder as the main prescription composition of chai hu, containing Sichuan root, Xiangfu, Tangerine Peel, Peony, Citrus Shell, Acacia Peel, Hot Licorice, and others. Interestingly, they found that the treatment group showed the total efficiency rate of 90.00%, while the total effective rate of treatment of anxiety and depression was 92.50%, which significantly higher than the control group ( $p < 0.05$ ). After 1 month of treatment, it was found that the treatment group's left ventricular ejection fraction (LVEF), cardiac output (CO) is higher than the control group. The 6-minute walking distance is longer in the treatment group compared to the control group, and the left ventricular end diastolic diameter (LVEDD) is lower than that of the control group ( $p < 0.05$ ), indicating that the addition of Traditional Chinese medicine theory on the basis of Western medical treatment can take the length of the two and effectively improve the patient's heart function. In addition, Xue Hongli et al., [17] based on the random number table method 148 patients with chronic heart failure were selected, and the effect of Zhenwu Tang and Qiaoshan on the emotional change of patients with yang deficiency and liver qi depression was studied. The control group was given oral Lu Youtai and the observation group was given oral Zhenwu Tang combined with or without Qiaoshan, and it was found that the Hamilton depression scale (HAMD) and Hamilton anxiety scale (HAMA) scores of the observation group after 12 weeks of treatment were lower, than the control group, and the study concluded that the treatment of patients with CHF with depressive disorder can be treated by Zhenwu Tang Yaoshan. It can improve the patient's heart failure and depressive symptoms, subsequently, improve the life quality of the patients. Therefore, CHF combined with anxiety and depression can be treated by liver theory, and liver relief, by symptomatic addition and subtraction of drugs.

### 3.2.2. Wenyang Qi Method

Wenyang Liqi method refers to the use of Wenyang medicine, such as ginger, Gui, Fuzhi To Wentong to help Yang Qi<sup>[18]</sup>, and Liqi medicine, such as Xiangfu, Tulip to adjust the qi machine. Wenyang method for the treatment of heart failure was first seen in the “Yellow Emperor’s Inner Classic,” such as “those who like blood qi, like temperature and cold, cold could not stay, wen is gone,” pointing out that the disease mechanism of heart failure is heart and yang weakness, where the blood veins are not clear, and it is advisable to cure Wen Tong. Over the years, Professor Li Jie has used the Wenyang Liqi method to treat CHF combined with depression yang deficiency qi depression, and Fang selects Wenyang to solve depression soup, and achieved a good clinical efficacy<sup>[19]</sup>. The basic composition of Wenyang is as follows; Cannon Appendage 9 g, White Peony 6 g, Bai Shu 6 g, Poria 9 g, Chai Hu 9 g, Citrus Aurantium 6 g, Xue Bai 9 g, Guizhi 12 g, Vinegar Incense 9 g, Tangerine Peel 9 g, Ginger Half Summer 9 g, Cannon Ginger 9 g, and Licorice 9 g. The various medicines are matched, on the other hand, the reverse of the downward and flat rushes into the line of qi, in order to restore the lifting and lowering of the gas machine, meanwhile the Wenyang is scattered within the Rational Qi, in order to publicize the paralysis of yin and cold phlegm, and the whole party plays the work of Wenyang Rational Qi, phlegm, and stasis.

### 3.2.3. Blood-activating water method

The basic disease mechanism of heart failure is the basic virtual standard reality, the original virtual is mostly the heart qi deficiency, the heart blood deficiency, the heart yin and yang deficiency, and the standard reality is mostly water stop and blood stasis. “Blood stasis” and “water stopping” are indeed common symptoms of clinical heart failure<sup>[20]</sup>. Xue Jingui et al.,<sup>[21]</sup> conducted a study in 30 patients with CHF and depression, in addition to conventional treatment the patients were treated with traditional Chinese medicines, such as Red Peony, Angelica, Sichuan Root, Pig Lily, Poria, and Baishu, and it was found that the treatment group’s show TCM symptoms with significant ( $p<0.05$ ) quality of life improvement, than the control group. In addition, Gu Yanpin et al.,<sup>[22]</sup> study on 90 patients with mild depression after heart failure, and after 8 weeks of treatment with Yixin Jieyu Soup containing Danshen, Tulip, Poria, Ze Diarrhea, Guizhi, and others the patients observed the changes in cardiac function indicators, and the level of human brain-derived neurotrophic factors (BDNF), which were significantly inversely correlated with depression, and found that the serum BDNF content increased significantly compared with conventional anti-heart failure treatment ( $p<0.05$ ). It can be seen that the treatment of active blood and water could not only alleviate the acute symptoms of patients’ heart failure, but also reduce the psychological pressure of the patients.

## 4. Summary

In recent years, CHF is frequently associated with anxiety-depressive states, therefore the prognosis of this disease is poor, which has a serious impact on the life quality of the patients. However, Chinese and Western medicine has made some progress in the treatment of CHF with anxiety and depression. This paper mainly discusses the pathogenesis and treatment of Traditional Chinese and Western medicine. In terms of treatment, the treatment effect of Western medicine compared with traditional Chinese medicine treatment, Western medicine treatment method is single, and may have large side effects. From the overall point of view, Chinese medicine has achieved good efficacy in the dialectical treatment of CHF combined with anxiety and depression with small side effects, showing a unique advantage.

## Disclosure statement

The authors declare no conflict of interest.

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