

Research Progress of Integrated Traditional Chinese and Western Medicine in Diagnosis and Treatment of Heart Failure

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Abstract: Heart failure (HF) is an end-stage cardiac disease with abnormal cardiac structure and function caused by a variety of factors. In recent years, with the continuous in-depth research on the etiology and mechanism of heart failure, clinical drug therapy has made many breakthroughs. Different subject in traditional Chinese medicine dialectical treatment on the basis of using the different methods of treatment, has a good curative effect in clinic. This combined with traditional Chinese and western medicine treatment of heart failure and understanding to carry on the literature review, is aimed at providing treatment for clinical reference.

Keywords: Heart failure, Traditional Chinese medicine, Western medicine, Treatment.

1. Introduction

Heart failure is a variety of reasons resulting in abnormal cardiac structure and function of the clinical syndrome [1]. In recent years, the incidence of heart failure has gradually increased with the aging of the population in China and the increasing incidence of cardiovascular chronic diseases [2]. At present, the pathogenesis of heart failure is still unclear, and it is believed to be related to the interaction of various mechanisms, which eventually leads to cardiac remodeling [3]. Western medicine in the treatment of heart failure is effective for prevention and cure of heart failure quickly, curative effect is obvious advantages, but at the same time there is also a drug resistance and side effects, such as condition easily repeated. The treatment of heart failure with traditional Chinese medicine has the characteristics of syndrome differentiation and treatment and is different from person to person, but the use of traditional Chinese medicine alone has the characteristics of weak efficacy and insufficient convenience. In recent years, with a large number of clinical practice, it has been found that the combination of Chinese and western medicine can effectively overcome the limitations and adverse reactions of Chinese and western medicine, and drug treatment has made many breakthroughs. Therefore, this article reviews the treatment of Chinese and western medicine, in order to provide clinical treatment reference.

2. Research Status of Heart Failure in Traditional Chinese Medicine

2.1 Origin of Disease Name

The word "heart failure" was first seen in the Western Jin Dynasty · Wang Shuhe's "pulse meridian · spleen and stomach disease," saying: "heart failure is hidden, liver is sinking, so the pulse is hidden and sinking" [4]. In the Tang Dynasty, Sun Simiao directly put forward the name of "heart failure" for the first time in the "Qianjin Yaofang · Xinmen" [5]. In the Song Dynasty, 'Shengji Zonglu · Heart Gate' had 'heart failure is forgetful' [6]. The Yuan Dynasty Cheng Xing

Xuan 's' medical reference ' said: 'The main vein, claw nail is not Hua, then heart failure'. Because of the vastness of ancient Chinese medical books and the lack of systematic research and summary of heart failure, the symptoms of 'heart failure' in ancient medical books are often inconsistent with the symptoms of modern heart failure. The earliest description of heart failure symptoms in traditional Chinese medicine is seen in the 'Neijing', which mainly records symptoms such as asthma and cough, shortness of breath, heart drum, deficiency in the body, body weight, abdominal swelling, hemoptysis, and black face. The main clinical symptoms of patients with heart failure such as dyspnea, systemic edema, chest tightness, shortness of breath, fatigue and oliguria. In traditional Chinese medicine, heart failure can be classified into 'asthma syndrome', 'palpitation' and 'heart water disease'. The symptoms of severe patients are mainly manifested as sitting breathing, cyanosis, ascites, and dyspnea, which can often be divided into the category of 'off syndrome' and 'Jue syndrome' [7]. There are many causes and symptoms of heart failure. The ancient books have different expressions on the name, symptoms and symptoms of heart failure, which is determined by the nature of heart failure.

2.2 Etiology and Pathogenesis of HF

The discussion of the etiology of heart failure was first seen in the 'Neijing' 'lao is wheezing and sweating, the more outside and inside, the more gas consumption', 'taste is too salty, big bone gas labor, short muscle heart gas suppression', 'It is so salty, the pulse is condensed and the color changes the taste', 'too sweet, the heart gas is full' [8]. In the Qing Dynasty, 'Yilin Gaicuo' recorded that 'Yuanqi deficiency can not reach the blood vessels, and the blood vessels will stay and stasis without Qi. It is suggested that Qi deficiency and blood stasis, blood stasis stagnation in the pulse so that the heart is not nourished is also the pathogenesis of heart failure. Professor Lei Zhongyi believes that qi deficiency and yang deficiency, blood stasis and water retention are the basic pathogenesis of heart failure, and the deficiency of heart qi and blood is the basic pathological change of heart failure, which runs through the whole process of the occurrence and development of heart

failure [9]. Professor Tan Xiaowen pointed out that the main pathogenesis hypothesis of chronic heart failure is the damage of toxin to the heart. The pathogenesis of heart failure is mainly the damage of yin and yang and the loss of heart qi, which is manifested as the damage of toxin and blood stasis to the heart, which belongs to the empirical pathogenesis [10]. According to the performance of patients with chronic heart failure, such as spleen deficiency complicated with phlegm, fluid retention, turbidity and stagnation, resulting in heart yang failing to develop, lung qi failing to descend, and bowel qi failing to descend, Professor ZHU Wang Zili treats heart failure from the perspective of spleen and stomach. Professor ZHU believes that the formation of dampness, phlegm and blood stasis caused by spleen deficiency is the key pathogenesis of chronic heart failure [11]. Combined with the theory of 'one qi circulation', Professor Ren Yi believes that the pathogenesis of heart failure is stagnation of heart and lung and poor qi movement. The life gate fire decays, the pivot is unfavorable; the soil was wet and the four elephants were disordered [12]. Ancient and modern doctors have many discussions on the etiology and pathogenesis of heart failure in various aspects. Most of them believe that the disease is based on deficiency and excess, and the combination of deficiency and excess is the disease. The etiology is related to exogenous six evils, fatigue, seven emotions, pregnancy and childbirth or eating disorders. Therefore, the etiology and pathogenesis of heart failure should be grasped in clinical practice to achieve dialectical treatment.

2.3 Treatment with Traditional Chinese Medicine

2.3.1 The dialectical argument

According to the symptoms of patients, the 13th Five-Year textbook of 'Internal Medicine of Traditional Chinese Medicine' divides heart failure into four syndromes: qi deficiency and blood stasis, qi and yin deficiency, yang deficiency and water stop, and asthma. Qi deficiency and blood stasis type is the beginning of heart failure disease, heart qi deficiency, promote fatigue, lung qi deficiency, Xuanjiang no right to necessarily blood stasis resistance. Zhao Lei used Yiqi Huoxue Decoction to treat 80 cases of chronic heart failure with Qi deficiency and blood stasis. The treatment group was treated with Yiqi Huoxue Decoction on the basis of the same western medicine treatment, and the treatment group was treated with Yiqi Huoxue Decoction. The effective rate of the treatment group was 95 % better than that of the control group 77.50 %. The deficiency and excess of Yiqi Huoxue Decoction were taken into account, and the function of Yiqi Huoxue Yangxin was improved from improving myocardial contractility and improving cardiac function [13]. Qi and Yin deficiency type is mostly due to heart qi deficiency, qi does not transport blood, heart yin deficiency, yin deficiency and blood astringency, manifested as qi and yin deficiency, heart failure, and then qi deficiency and yang deficiency or yin deficiency and yang, and the development of yin and yang deficiency, heart vessel stasis. Professor Shen Jianping used Jiawei Shengmai Powder to treat chronic heart failure type 60 with deficiency of both qi and yin. The basic prescription: Codonopsis 10 g, Ophiopogon 6 g, Schisandra 6 g, Astragalus 10 g, Tinglizi 20 g, Safflower 6 g, Alisma 10 g, the combination of various drugs, played a total of Yiqi Yangyin, Lishui Huoxue effect,

the cardiac function of the study group was significantly better than that of the control group [14]. Heart yang deficiency is weak to promote the blood vessels are not, kidney yang deficiency bladder gasification is unfavorable water wet stop, kidney yang deficiency is heart yang, heart and kidney affect each other, forming a vicious circle. Professor He Changguo used Modified Linggui Zhugan Decoction to treat 98 patients with chronic heart failure with Yang deficiency and water retention syndrome. On the basis of Linggui Zhugan Decoction, the symptoms were significantly relieved before and after treatment. The levels of TNF- α , TGF- β 1, Hcy and NT-ProBNP in the treatment group were lower than those in the control group, which could reduce the inflammatory response, prevent ventricular remodeling and improve clinical efficacy [15]. The syndrome of asthma is characterized by sudden loss of heart yang and separation of yin and yang, forming a critical syndrome of heart failure. The commonly used classical prescriptions for restoring yang and solid off include Shenfu Decoction and Sini Decoction [16]. Based on network pharmacology and animal experiments, Professor Li Baolong believes that Shenfu Decoction may regulate the apoptotic signaling pathway of myocardial cells by targeting Bax and Bcl-2, thus playing a preventive and therapeutic role in rats with cardiogenic shock [17]. Professor Shen Xiaoxu observed through animal experiments that Sini Decoction can improve the cardiac function of rats with chronic heart failure caused by myocardial infarction, reduce ventricular remodeling after myocardial infarction, and regulate oxidative stress to a certain extent [18]. Traditional Chinese medicine has the advantage of syndrome differentiation and treatment for patients with heart failure. The clinical effect of dialectical treatment is remarkable, which is worthy of learning by doctors. Therefore, in clinical practice, we should examine carefully and dialectically and accurately play the unique advantages of traditional Chinese medicine.

2.3.2 experience of famous doctor

Academician Zhang Boli proposed that the clinical syndrome differentiation and treatment of heart failure in TCM should be divided into three main clinical stages: acute exacerbation, post-control remission and stable period [19]. For patients in the stable period, attention should be paid to conditioning, mainly to protect the vital qi, improve the heart function and improve the quality of life of patients with heart failure through conditioning. Patients in the acute exacerbation period are mainly based on eliminating evil, supplemented by strengthening the vital qi. After dialectical treatment, the development of the disease is controlled. Patients in the post-control remission period are expected to improve the prognosis of patients with heart failure by seasonal medication and diet therapy. Deng Tietao, a master of traditional Chinese medicine, put forward the theory of 'five viscera correlation'. For the treatment of heart failure, the treatment system of 'five viscera correlation, heart-based, other viscera as the standard' [20]. Professor Deng believes that 'all five viscera cause heart failure, not only heart'. Therefore, in the treatment, based on the theory of five viscera correlation, the heart is the main, the spleen and stomach are protected, the kidney is strengthened, and the liver and lung are soothed. Professor Lei Zhongyi believes that 'qi deficiency and yang deficiency, blood stasis and water

retention ' are the basic pathogenesis of heart failure. In the treatment of heart failure, the methods of invigorating qi and warming yang, promoting blood circulation and promoting diuresis are often used. Red ginseng, prepared aconite, cassia twig, poria cocos, astragalus membranaceus, semen lepidii, acanthopanax senticosus are commonly used to remove blood stasis, warm yang and promote diuresis, regulate qi and blood [9]. Therefore, the treatment of patients with heart failure should first be Fuyang Guben, Huayu Lishui, combined with Liqi Sanjie, Huatan Quyu, Gongxia Zhuyin, as usual, it is changed.

2.3.3 Internal and external combined treatment

Wang 's Yiqi Wenyang Lishui Decoction combined with acupuncture Xinshu point treatment, clinical observation of 80 cases of heart failure patients in the treatment group was significantly better than the control group, Xinshu for the heart of the back-shu point, with nourishing blood and tranquilizing the mind, tranquilizing the mind, and improving the patient 's inflammatory index to improve the prognosis of patients, so it has certain guiding significance for clinical practice [21]. Through the combination of exercise training and acupuncture, Neiguan, Xuehai, Fenglong, Zusanli, Shenmen and Xinshu were taken as the main points, and the points were treated dialectically to give full play to the effects of Wenyang Huayin, Yiqi Huoxue. The 6-minute walking experiment and quality of life were used as the observation indicators. The control was significantly improved. Combined acupuncture on the basis of exercise training can effectively improve cardiac function [22]. Through the experiment of acupuncture at Neiguan point in mice, Guo Ying observed that acupuncture at Neiguan point could improve the cardiac function of mice and inhibit ventricular remodeling. At the same time, it could reduce the content of pro-inflammatory factors IL-1 β and TNF- α in myocardial tissue and plasma, and slow down the process of inflammatory reaction. As a heart meridian point, Guan acupoint has a two-way regulation function on the heart as an eight-pulse intersection point, which is a classic acupoint for the treatment of cardiopulmonary diseases [23]. On the basis of standardized western medicine treatment, Zheng Yan combined with ' Sanshui point ' herb-separated moxibustion and Shuiquan point to observe the total effective rate of 92 patients with chronic heart failure with Yang deficiency and water flooding. The total effective rate of the observation group was 93.5 %, which significantly improved the cardiac function of chronic heart failure with Yang deficiency and water flooding. Improve the quality of life of patients, and have a significant regulatory effect on serum NT-proBNP and cardiac color Doppler ultrasound related indicators [24]. In summary, acupuncture and moxibustion can stimulate the qi of meridians and collaterals, promote the blood circulation of the lesion, thereby reducing the symptoms and signs of heart failure and improving the clinical efficacy.

3. Research Progress of Western Medicine

3.1 Clinical Symptoms and Diagnostic Criteria

Heart failure (HF) is a group of complex clinical syndromes caused by abnormal changes in cardiac structure and (or) function caused by a variety of reasons, resulting in

ventricular systolic and (or) diastolic dysfunction. Main show is dyspnea, fatigue and fluid retention (congestion, systemic blood and peripheral edema of the lungs), etc. The diagnosis [1] of heart failure and evaluation depends on the history, physical examination, laboratory tests, cardiac imaging and functional check. The diagnosis of heart failure includes: past history, symptoms or signs of heart failure, abnormal electrocardiogram, cardiac color Doppler ultrasound EF < 50%, cardiac structural dysfunction or brainnatriuretic peptide (BNP) > 100 ng/dL. Cardiac function was graded according to the New York Heart Association (NYHA) criteria [25].

3.2 Pathogenesis

Primary myocardial damage and abnormalities are the main causes of heart failure. In addition to cardiovascular diseases, non-cardiovascular diseases can also lead to heart failure. The pathogenesis of heart failure is still unclear. At present, it is believed to be related to sympathetic nerve stimulation, activation of renin-angiotensin-aldosterone system, oxidative stress, secretion of inflammatory cytokines, apoptosis and so on [26]. Ventricular remodeling is the pathological key to the pathogenesis of heart failure. At the same time, immune mechanism, inflammatory mechanism and intestinal flora imbalance may also be related to the occurrence and development of heart failure [27]. The excessive activation of renin-angiotensin-aldosterone can cause the increase of aldosterone, angiotensin II and other humoral factors, which eventually leads to water and sodium retention, myocardial remodeling and decompensated heart failure, leading to the deterioration of heart function. Autophagy and oxidative stress are involved in the occurrence and development of a variety of cardiovascular diseases. Autophagy can degrade excess cytoplasmic proteins and organelles, control the weight of myocardial tissue, and protect the normal structure and function of the heart [28]. Autophagy plays a dual role in cardiovascular diseases. Oxidative stress can cause endothelial dysfunction, myocardial cell damage, apoptosis and other pathological changes, and participate in the process of ventricular remodeling. The research of autophagy and oxidative stress in the field of cardiovascular disease can provide a new strategy for the prevention and treatment of cardiovascular disease. In heart failure, due to the stimulation of various factors, the inflammatory response of vascular endothelial cells and cardiomyocytes is enhanced, the release of inflammatory factors is increased, and the binding of inflammatory factors to receptors causes damage to cardiomyocytes and interstitial cells, and promotes myocardial remodeling. Results in the decline of cardiac function [29]. Apoptosis is programmed cell death, the process is controlled by polygene, it is in the development of the happening of the disease plays an important role. A number of studies have shown that apoptosis is widely present in the pathogenesis of various heart failure, and leads to the occurrence of myocardial remodeling and accelerates the progression of heart failure [30]. Found abnormal fibroblasts in ventricular remodeling in recent years has the resistance of cell apoptosis, and lead, in the development of abnormal myocardial substrate, resulting in the occurrence and progress of heart failure.

3.3 Western Medicine Treatment

At present, the treatment of heart failure includes general treatment including etiological treatment, removal of inducing factors of heart failure, lifestyle modification, drug therapy, palliative treatment, heart transplantation, stem cell transplantation, replacement therapy and other therapies [1]. On the treatment strategy for heart failure patients, according to the condition, recommend giving drugs, short-term or long-term MCS, an LVAD or different treatments, such as heart transplantation in order to achieve the optimal effect. At present by correcting neurohumoral drug heart failure mechanism of abnormal activation, regulating cell factors, vascular endothelial active substance, inhibiting inflammatory reaction and so on, to slow or reverse cardiac remodeling, achieve the result that not only from the blood dynamics to improve symptoms, at the same time, the purpose of improving the prognosis of biology [31]. At present the conventional drug treatment of heart failure including digitalis kind cardiotoxic and vasodilator, diuretics, beta-blockers, angiotensin converting enzyme inhibitors (angiotensin converting enzyme inhibitor, ACEI) and angiotensin receptor blockers (angiotensin receptor blocker, ARB) and mineralocorticoid receptor antagonist (mineralocorticoid receptor antagonist, MRA), etc. And new drugs, such as angiotensin receptor neprilysin inhibitor, sodium-glucose cotransporter inhibitor, viliciguat, ivabradine, and cardiac myosin activator. Palliative treatment [32] refers to the provision of comprehensive and active treatment and care for patients who cannot be cured to control pain and other unbearable symptoms. The palliative treatment model of heart failure emphasizes the extension of life treatment and palliative treatment as soon as possible. The choice of palliative treatment in the early stage of heart failure has positive significance in improving cardiac function and improving prognosis. Mechanical circulatory support and heart transplantation have played an important role in the treatment of end-stage severe heart failure. However, due to the high economic cost and the relatively small number of donors in China, most patients with severe heart failure still benefit less [33]. Medical research on the mechanism of heart failure continues to develop, and the corresponding western medicine treatment has corrected hemodynamic abnormalities in the short term, focusing more on long-term regulation of neurohumoral and reversal of myocardial abnormalities [34]. Single chemical drugs may lead to serious side effects. At the same time, due to the unsatisfactory control of primary disease, diuretic resistance, complications and psychological factors, the effect of western medicine on heart failure is not good [35]. It can be diagnosed and regulated by traditional Chinese medicine if necessary. The combination of traditional Chinese and western medicine can effectively overcome the limitations and adverse reactions of western medicine.

4. Treatment with Combined Therapy of Traditional Chinese and Western Medicines

Zhang Lei [36] used Tongxinluo capsule combined with sacubitril valsartan tablets to treat 92 cases of chronic heart failure. The effective rate of the study group was 97.83%. The effective rate of combined treatment of traditional Chinese and Western medicine was higher, the symptom score was lower, the cardiac function was improved better, the inflammation was milder, and the adverse cardiovascular events were lower. It is suggested that Tongxinluo capsule

adjuvant therapy can improve the curative effect. Dong Xiaonan [37] by traditional Chinese medicine combined with sacubitril valsartan in the treatment of chronic heart failure with hypotension in 100 patients, the use of traditional Chinese medicine prescription: Zhihuangqi 20g, Dangshen 15g, Paofuzi 10g, Fuling 15g, Chaobaizhu 15g, Guizhi 20g, Ganjiang 15g, Baishao 15g, Maidong 20g, Tinglizhi 10g, Taoren 10g, Zhigancao 9g, Wenyang Lishui, better improve the patient's heart function, and improve the hypotension. Bian Huaxing [38] used Taohong Siwu Decoction combined with western medicine to treat 77 patients with heart failure and angina pectoris. After treatment, the levels of serum ET-1 and NT-proBNP in the treatment group were lower than those in the control group, and BNP, IL-6 and hs-CRP were also lower than those in the control group. Taohong Siwu Decoction has the effects of nourishing blood, promoting qi, activating blood circulation, warming yang and promoting diuresis. Modern pharmacological research Taohong Siwu Decoction has the effects of improving cardiac microcirculation, immune regulation, protecting the heart and improving cardiac coronary blood supply. Combined with western medicine to improve the cardiac function of patients with clinical efficacy. Simple western medicine treatment of heart failure in clinical has a certain curative effect, but at the same time because of the primary disease control is not ideal, diuretic resistance, complications and psychological factors lead to western medicine treatment of heart failure effect is not good, the combination of the use of traditional Chinese medicine to dialectical treatment of different characteristics of multi-target therapy, greatly improving the clinical efficacy. In the diagnosis and treatment of heart failure disease, the combination of traditional Chinese and Western medicine treatment can play the greatest effect of diagnosis and treatment for patients to alleviate pain and improve the quality of life of patients.

5. Conclusion

In recent years, with the aging of the population in China, the incidence of cardiovascular chronic diseases is on the rise, and the effective evidence-based treatment of heart failure has gradually increased the incidence of heart failure. The mortality rate of heart failure has also increased due to the increase in morbidity, which has brought a heavy burden to China's health care system. Western medicine has the advantages of rapid onset and obvious curative effect in the prevention and treatment of HF, but there are also shortcomings such as drug resistance, large side effects, and easy recurrence of the disease. Traditional Chinese medicine is considered to be an alternative treatment strategy for the treatment of heart failure. Traditional Chinese medicine treatment has a therapeutic principle based on the dialectical demonstration of patients' symptoms. Traditional Chinese medicine has become the focus of research in this field because of its small side effects, good compliance, multi-target and multi-effect on the human body, which can significantly improve clinical symptoms and significantly improve prognosis. Therefore, looking for ways to improve the survival rate of patients with heart failure, reduce their hospitalization rate, and improve the quality of life is the focus of current research on the treatment of this disease.

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References

- [1] Chinese guidelines for the diagnosis and treatment of heart failure 2024 [J]. *Zhonghua xin xue guan bing za zhi*, 2024, 52 (3): 235-275.
- [2] Savarese G, Becher PM, Lund LH, Seferovic P, Rosano GMC, Coats AJS. Global burden of heart failure: a comprehensive and updated review of epidemiology. *Cardiovasc Res*. 2023 Jan 18;118 (17):3272-3287.
- [3] Triposkiadis F, Xanthopoulos A, Parissis J, Butler J, Farmakis D. Pathogenesis of chronic heart failure: cardiovascular aging, risk factors, comorbidities, and disease modifiers. *Heart Fail Rev*. 2022 Jan;27 (1):337-344. doi: 10.1007/s10741-020-09987-z. PMID: 32524327
- [4] Wu Wei, Liu Yong, Zhao Yingqiang. Heart failure as a TCM disease name of heart failure to explore [J]. *Journal of Traditional Chinese Medicine*, 2013,10:891-892.
- [5] Zhang Yan, Li Hai, Wang Cailing. Study on the pathogenesis of chronic heart failure in traditional Chinese medicine [J]. *Lishizhen Medicine and Materia Medica Research*, 2011,06: 1547-1548.
- [6] Jiang Chengli., Zeng Jianbin, Wan Chanjun. Wu Bingcai 's experience in the treatment of heart failure [J]. *Jiangxi Journal of Traditional Chinese Medicine*, 2014,10: 17-18.
- [7] Liu Yali. Based on classical medical books and literature to explore the treatment of chronic heart failure in traditional Chinese medicine [J]. *Inner Mongolia Journal of Traditional Chinese Medicine*, 2022,04: 153-155.
- [8] Zhang Yikun, Han Jingbo. Professor Fang Xianming 's experience in the treatment of chronic heart failure [J]. *Guangxi Journal of Traditional Chinese Medicine*, 2011,03: 37-38.
- [9] Chen Shucun. Lei Zhongyi 's experience in the treatment of heart failure [J]. *Journal of Shaanxi University of Chinese Medicine*, 2020,01: 23-25 + 47.
- [10] Huang Jia. Tan Xiaowen 's clinical experience in TCM syndrome differentiation and treatment of heart failure [J]. *Inner Mongolia Journal of Traditional Chinese Medicine*, 2022,08:67-69.
- [11] Yang Ani, Liu Shuying, Wang Yu. Wang Zili chief physician from the spleen and stomach on the treatment of chronic heart failure clinical experience [J]. *Western Journal of Traditional Chinese Medicine*, 2021,01: 28-30.
- [12] Yao Qiuju, Jia Bing, He Deying, Ren Yi. Analysis of the treatment of heart failure [J]. *Journal of Emergency in Traditional Chinese Medicine*, 2023,04: 643-646.
- [13] Zhao Lei. Clinical Research on Yiqi Huoxue Decoction in the Treatment of Chronic Heart Failure with Qi Deficiency and Blood Stasis [J]. *Chinese Archives of Traditional Chinese Medicine*, 2013,11: 2586-2587.
- [14] Cai Rui, Yang Yuedong, Shen Jianping. Clinical efficacy of Jiawei Shengmai Powder in the treatment of chronic heart failure of qi and yin deficiency type [J]. *Cardiovascular Disease Electronic Journal of Integrated Traditional Chinese and Western Medicine*, 2020,08: 173 + 177.
- [15] Wang Hua, Luo Yuhuan, Wang Yue, Huang Jinling, He Changguo. Effects of Modified Linggui Zhugan Decoction on TGF- β 1, TNF- α , NT-proBNP and ventricular remodeling in patients with chronic heart failure with Yang deficiency and water retention syndrome [J]. *Journal of Basic Chinese Medicine*, 2024,05: 853-856.
- [16] Chu Xinyu, Wei Xiaohong, Wu Xuefen, Chen Jie, Xia Huan, Xia Guiyang, Lin Sheng, Shang Hongcai. Research progress on pharmacological effects of five classical prescriptions in the treatment of chronic heart failure [J]. *China Journal of Chinese Materia Medica*, 2023,23: 6324-6333.
- [17] Xu Jingya, Zhang Chunlei, Li Baolong. Based on network pharmacology and experimental verification, the mechanism of Shenfu Decoction on cardiogenic shock was discussed [J]. *Chinese Pharmacological Bulletin*, 2023,08: 1548-1557.
- [18] Han Qingqing, Shen Xiaoxu, Zhao Jing, Zhu Yuhan, Baiyun Hao, Wang Zhen, Li Jiebai, Liu Lei. Sini Decoction on cardiac function and oxidative stress in rats with chronic heart failure after myocardial infarction [J]. *Global Traditional Chinese Medicine*, 2019,06: 819-824.
- [19] Jin Xinyao, Zhang Junhua, Zhang Lishuang, Liu Qiang, Cui Yuanwu, Ma Yan, Li Xiao, Lv Ling, Wang Kai, Jiang Feng, Zhang Boli. Zhang Boli 's experience in the diagnosis and treatment of chronic heart failure by stages [J]. *Journal of Traditional Chinese Medicine.*, 2018,19: 1633-1636.
- [20] Tao Wenxiang, Zheng Chaoyang, Sun Haijiao, Shang Baoling. Deng Tietao, a master of traditional Chinese medicine, treats heart failure with preserved ejection fraction from the theory of five viscera correlation [J]. *Acta Chinese Medicine*, 2020,11: 2372-2375.
- [21] Wang Dong. Effects of Yiqi Wenyang Lishui Decoction combined with acupuncture at Xinshu Point on serum IL-17TNF- α in patients with chronic heart failure [J]. *Journal of Sichuan of Traditional Chinese Medicine*, 2015,12: 47-49.
- [22] Tian Tian, Chai Shaolong. Effect of acupuncture combined with exercise training on cardiac function and quality of life in patients with chronic heart failure [J]. *Journal of Practical Traditional Chinese Internal Medicine*, 2023,10: 125-128.
- [23] Guo Ying, Sun Xinghua, Wu Wenpeng, Sun Yuanzheng, Zhu Pengyu, Zhao Guangran. Effects of acupuncture at Neiguan on cardiac function and inflammatory factors in mice with chronic heart failure [J]. *Journal of Changchun University of Chinese Medicine*, 2017,03: 362-364.
- [24] Zheng Yan, Zhang Weili, Gao Chen, Liu Haili, Li Jie, Li Shuxin, Li Wenqing. The effect of ' Sanshui point ' herbal-separated moxibustion on NT-proBNP and quality of life in chronic heart failure with Yang deficiency and water flooding syndrome [J]. *Shanghai Journal of Acupuncture and Moxibustion*, 1-5.
- [25] Caraballo C, Desai N R ,Mulder H,et al. Clinical implications of theNew York heart association

- classification [J]. *Am Heart Assoc*,2019; 8 (23): e014240.
- [26] Obokata M, Reddy YNV, Borlaug BA. Diastolic Dysfunction and Heart Failure With Preserved Ejection Fraction: Understanding Mechanisms by Using Noninvasive Methods. *JACC Cardiovasc Imaging*. 2020 Jan;13 (1 Pt 2): 245-257. doi: 10.1016/j.jcmg.2018.12.034. Epub 2019 Jun 12. PMID: 31202759; PMCID: PMC6899218.
- [27] Liu Xinxin, Gu Yanxia, Cai Lu, Liu Qiang. Research progress in the prevention and treatment of heart failure based on myocardial fibrosis [J]. *Zhejiang Journal of Integrated Traditional Chinese and Western Medicine*, 2022,03: 287-290.
- [28] Liu Demin, Jia Hongyu, Chai Wenjing, Hu Haijuan, Cui Wei. Research progress of autophagy and oxidative stress in cardiovascular diseases [J]. *Journal of Clinical Cardiology*, 2018,04: 402-407.
- [29] Xu Xiaohua, Liu Fengqi, Zhang Ruiying. Research progress of oxidative stress / reductive stress in heart failure [J]. *Chinese Journal of Multiple Organ Diseases in the Elderly*, 2019,09: 713-716.
- [30] Lu Lei, Liu Xiaodan, Zhang Peiying. Endoplasmic reticulum stress-mediated apoptosis and heart failure [J]. *Chinese Journal of Geriatric Heart Brain and Vessel Diseases*, 2018,04: 432-436.
- [31] Zhang Zhuxuan, Xu Lu. The clinical effect of recombinant human brain natriuretic peptide combined with levosimendan in the treatment of refractory heart failure and its effect on cardiac function [J]. *Clinical Research and Practice*, 2023,8 (27): 41-44.DOI: 10.19347/j.cnki.2096-1413.202327011.
- [32] Lowey SE. Palliative Care in the Management of Patients with Advanced Heart Failure. *Adv Exp Med Biol*. 2018;1067:295-311. doi: 10.1007/5584_2017_115. PMID: 29030806.
- [33] Chen Zhigao, Huang Jie, Zheng Zhe. The current status and progress of mechanical circulation-assisted transition to heart transplantation [J]. *Practical Journal of Organ Transplantation (Electronic Version)*, 2023, 11 (03): 197-201 + 192.
- [34] Wang Y, Wang Q, Li C, Lu L, Zhang Q, Zhu R, Wang W. A Review of Chinese Herbal Medicine for the Treatment of Chronic Heart Failure. *Curr Pharm Des*. 2017;23 (34):5115-5124. doi: 10.2174/1381612823666170925163427. PMID: 28950815; PMCID: PMC6340156.
- [35] RAWALA M S, AHMED A S, POSINA K, et al. Tirofiban induced thrombocytopenia: a rare but severe adverse effect [J]. *Journal of CommunityHospital Internal Medicine Perspectives*,2020,10 (2): 171-173.
- [36] Zhang Lei. Clinical Observation of Tongxinluo Capsule Combined with Sacubitril Valsartan Tablets in the Treatment of Chronic Heart Failure [J]. *Journal of Practical Traditional Chinese Medicine*, 2024,05: 958-960.
- [37] Dong Xiaonan, Wang Jun, Mao Jianfang, Liu Jinbo. Clinical Observation of Heart Failure No.1 Chinese Medicine Combined with Sacubitril Valsartan in the Treatment of Chronic Heart Failure with Hypotension [J]. *Chinese Archives of Traditional Chinese Medicine*, 1-9.
- [38] Bian Huaxing, Zhuang Yan, Gao Yongxing. Taohong Siwu Decoction combined with western medicine in the treatment of heart failure with angina pectoris and its effect on ET-1, NT-proBNP and heart failure markers [J]. *Liaoning Journal of Traditional Chinese Medicine*,: 1-6.