DOI: 10.53469/jcmp.2025.07(07).23

Mechanism of Heart Failure and Progress in Traditional Chinese Medicine Treatment

Miao Ye[1], Xuebin Chen[2,*]

[1]Shaanxi University of Chinese Medicine, Xianyang 712046, Shaanxi, China
[2]Affiliated Hospital of Shaanxi University of Chinese Medicine, Xianyang 712000, Shaanxi, China
**Correspondence Author*

Abstract: ***Heart failure, as the terminal phase of cardiovascular diseases, demonstrates escalating incidence amid aging populations and growing chronic disease burdens. This review systematically delineates modern pathological mechanisms of HF and its core pathogenesis in Traditional Chinese Medicine, revealing a dynamic progression pattern: Qi deficiency→ deficiency of both Qi and Yin→ water flooding due to Yang deficiency. Guided by the fundamental TCM principle of "benefiting Qi, Activating Blood Circulation, and promoting urination", interventions integrate acupuncture and moxibustion, tuina, traditional mind-body exercises (eg, Tai Chi), and multi-target herbal therapies to alleviate symptoms and provide organ-protective effects. Current research must prioritize elucidating precise targets and molecular pathways of Chinese herbs to enable precision medicine approaches, thereby advancing novel therapeutic strategies for HF.***

Keywords: Heart failure, Traditional Chinese medicine treatment**.**

1. Introduction

Heart failure (HF) is a disease characterized by impaired cardiac pump function, resulting in the heart's inability to meet the body's basal metabolic demands. Primary symptoms include dyspnea shortness of breath, reduced exercise tolerance, and fluid retention [1]. Chronic heart failure (CHF) refers to a persistent state of heart failure, which can exist in stable, worsening, or decompensated phases. The ultimate goals of HF treatment are not only to alleviate symptoms and improve patients' quality of life but also to delay the progression of myocardial remodeling, thereby reducing hospitalization rates and mortality among HF patients.

Epidemiological studies indicate that the incidence rate, rehospitalization rate, and mortality rate of HF patients remain high. In China, the aging population is accelerating, and the prevalence of chronic diseases such as coronary artery disease, hypertension, diabetes, and obesity is on the rise. On the one hand, advancements in medical care have prolonged the survival of patients with heart disease. On the other hand, these factors collectively contribute to a persistent upward trend in the prevalence of heart failure among the Chinese population [2]. Driven by this increasingly large patient population, the prevention and management of heart failure have become a major concern within the healthcare field.

2. Pathological Mechanisms of Heart Failure

2.1 Overactivation of the Neurohormonal System

Neurohormonal systems, including the sympathetic nervous system (SNS), the renin-angiotensin-aldosterone system (RAAS), and the natriuretic peptide system (NPS), are involved in the pathogenesis and progression of HF. During the early stages of HF, these neurohormonal systems become activated. This activation initiates compensatory mechanisms aimed at increasing myocardial contractility, enhancing ventricular preload, and promoting peripheral vasoconstriction. These effects collectively work to maintain perfusion to vital organs such as the heart, brain, and kidneys. However, persistent activation of neurohormonal systems and chronic reliance on these compensatory mechanisms become key drivers of HF progression and adverse outcomes [3]. SNS activation leads to peripheral vasoconstriction, increased cardiac afterload, elevated heart rate, and significantly heightened myocardial oxygen consumption. Excessive RAAS activation promotes myocardial hypertrophy and proliferation, stimulates cardiac fibroblasts to enhance collagen synthesis and cardiac fibrosis, thereby exacerbating ventricular and vascular remodeling, accelerating myocardial injury, and worsening cardiac function. Although the NPS functions to promote natriuresis and diuresis, the detrimental effects caused by the sustained overactivation of the SNS and RAAS significantly outweigh the potential benefits conferred by elevated natriuretic peptide levels [4].

2.2 Abnormal Energy Metabolism

The normal systolic and diastolic function of the heart depends critically on a continuous supply of energy. This energy production relies primarily on fatty acid oxidation, with minor contributions from glucose oxidation and anaerobic glycolysis. Alterations in metabolic substrates or abnormalities in mitochondrial function can result in dysregulation of myocardial energy metabolism during HF [5].

As HF progresses, myocardial energy metabolism shifts from primarily utilizing fatty acids to relying more on glucose metabolism [6]. Since glucose metabolism generates approximately one-third of the energy produced by fatty acid oxidation, this metabolic shift leads to insufficient energy supply to cardiomyocytes in the advanced stages of HF, further exacerbating the disease state. Concurrently, mitochondrial dysfunction impairs oxidative phosphorylation, contributing to this myocardial energy deficit. Furthermore, abnormalities in mitochondrial structure and function result in excessive production of reactive oxygen species, inducing oxidative stress, which also aggravates HF [7].

2.3 Myocardial Remodelling

Myocardial remodeling is a dynamic pathological process fundamental to the development and progression of HF, characterized by abnormal biological properties of cardiomyocytes and disrupted interactions with non-myocytes in response to stress [8]. This process manifests as changes in cardiac size, increased collagen deposition and fibrosis, reduced neovascularization, and dysregulation of remodeling-associated signaling pathways [9]. Initially, myocardial remodeling acts as a compensatory mechanism to preserve basic cardiac function. However, as HF advances, it ultimately impairs normal systolic and diastolic function, exacerbates cardiac fibrosis, reduces ventricular wall motion, and aggravates the pathological progression of HF [10].

3. Understanding of HF in Chinese Medicine

3.1 Clinical Manifestations of HF

The term HF first appeared in The Pulse Classic: Diseases of the Spleen and Stomach, written by Wang Shuhe during the Western Jin Dynasty. The text states: “When the Heart declines, the pulse becomes deep and hidden; when the Liver is faint, the pulse becomes sunken. Therefore, this causes the pulse to be both deep hidden and sunken. “The description of symptoms related to modern HF has been scattered in the Yellow Emperor’s Inner Classic, “Heart distension, irritability, shortness of breath, restlessness”, “Pulse paralysis, re-feeling evil, and staying in the heart”, “Heart paralysis, the pulse is blocked, the heart is beating, and the breath is panting. “In view of the aetiology and pathogenesis of heart failure, TCM practitioners have also put forward many views and understandings.

3.2 The etiology and Pathogenesis of HF

HF primarily arises from chronic heartburn, severe heart pain, or insufficiency of natural endowment. Over time, without proper recovery, these conditions lead to internal qi deficiency of heart. Subsequent factors such as recurrent invasion of external evil, emotional disturbances, or overstrain further injure the heart and deplete deficiency of heart Yang. This deficiency of qi and yang impairs the propelling function of qi, resulting in diminished blood circulation and disruption in the distribution of qi, blood, and body fluids. Consequently, a pathological state develops characterized by a deficient root and excessive branch. The root deficiency manifests as qi deficiency and yang deficiency, while the excess manifestations present as blood stasis, phlegm-turbidity, and fluid retention.

HF is recurrent and prolonged, and is the terminal stage of a variety of cardiovascular diseases. In the early stage of the disease, it is mostly due to the Qi deficiency of heart and lung, and the inability to transport blood, resulting in internal stasis and internal arrest. In the middle stage of the disease, it is mostly due to the loss of the heart and body, and the deficiency of both Qi and Yin. In the later stage of the disease, it is mostly due to qi deficiency and yang deficiency, and the water is overflowing [11].

4. Traditional Chinese Medicine Treatment of HF

In the treatment process of HF, it benefiting Qi, activating blood, and promote urination circulation throughout. The deficiency of qi and yang in the heart is a determinant of the occurrence, development and prognosis of HF, so benefiting Qi is the top priority in the treatment of HF. In the process of HF and development, blood stasis, phlegm-turbidity, and fluid retention are the main pathological products, and these pathological products can also aggravate water metabolism disorders in the process of HF, further damage heart qi and heart yang over time, forming a vicious circle.

4.1 Acupuncture and Moxibustion for HF

TYellow Emperor’s Inner Classic records that stimulating the body’s meridians and acupuncture points through acupuncture and moxibustion therapy can rharmonizing Qi and blood, dredging meridians and collaterals, and achieve overall treatment of systemic diseases. Ye Minyi et al. have shown clinical research that acupuncture and moxibustion combined with Western medicine can safely and effectively improve cardiac function in patients with HF, inhibit neuroendocrine activation and inflammatory responses [12].

4.2 Tuina for HF

Wang Shuang et al. found that Tuina combined with emotional care can synergistically improve the cardiac function and psychological state of patients with heart failure through the simultaneous treatment of body and mind [13].

4.3 Traditional Chinese Medicine Exercises for HF

Traditional Chinese medicine Daoyin is a traditional health preservation exercise that integrates body movement, respiratory regulation and mind guidance, and achieves the effect of disease prevention and treatment by harmonizing Qi and blood, warming yang to supporting vital Qi and expelling evils, and the representative exercises include Tai Chi, Baduanjin, Wuqin Opera, etc. Pan Lin et al. demonstrated that incorporating Tai Chi training into conventional therapy significantly improved cardiac functional classification, activities of daily living scores, and sleep quality scale ratings [14]. Guo Wenjing et al. reported that after 90 days of Baduanjin exercise combined with pharmacotherapy in HF patients, left ventricular ejection fraction and 6-minute walking distance were significantly increased compared to medication-only groups, with concurrent enhancement in cardiopulmonary endurance [15]. Additionally, Liu Xiaojuan et al. confirmed that 4-week Wuqin Opera exercise intervention improved NT-proBNP levels and cardiac function classification in heart failure patients [16].

4.4 Auricular Acupressur and Acupoint Application Therapy for HF

Dai Changwen et al. demonstrated that auricular acupressure combined with acupoint application therapy in HF patients significantly alleviated clinical symptoms, improved vascular endothelial function, and enhanced quality of life [17].

4.5 Traditional Chinese Medicine Monomer for HF

Modern pharmacological studies demonstrate that Ramulus

Cinnamomi exhibits multiple physiological activities including vasodilation, microcirculation improvement, anti-coagulation, antiplatelet aggregation, anti-inflammation, hypotension, and diuresis [18]. Cinnamaldehyde significantly enhances blood circulation by dilating both central and peripheral blood vessels [19]. Tanshinone—the active constituent of Salvia miltiorrhi—dilates peripheral vessels, inhibits myocardial contractility, increases blood flow in ischemic myocardium, reduces cardiac load, attenuates ultrastructural damage in post-ischemic brain tissues and mitochondria, and delays ventricular remodeling. Flavonoid glycosides from Tinglizi enhance left ventricular pumping function and myocardial contractility, regulate coronary blood flow, and reduce vascular resistance, thereby mitigating cardiac impairment [20]. Aconite exerts cardiotonic effects that alleviate symptoms of HF [21], it also improves circulation and significantly enhances cardiac systolic function in CHF patients [22]. Zhou Jing et al. revealed that Ginger Decoction augments myocardial contractility, elevates heart rate, and boosts cardiac output in post-cardiac arrest resuscitated rats [23].

Glycyrrhetinic acid—a key acidic component of licorice—combined with aconitine reduces cardiomyocyte apoptosis and significantly suppresses myocardial hypertrophy while improving cardiac dysfunction in HF [24]. Chen Cong et al. found that paeonol from Cortex Moutan downregulates myocardial injury biomarkers and inhibits apoptosis to protect against cardiac damage [25]. Arharnazyn et al. demonstrated that Ginkgo biloba extract aids HF treatment through antioxidant effects and inhibition of myocardial remodeling [26]. (Refer to Table 1 for details).

Table 1: Mechanism of action of traditional Chinese medicine monomer in HF

Traditional Chinese medicine monomer	Mechanism of action
Ramulus Cinnamomi	Vasodilation, Vasodilation, anti-coagulation and antiplatelet aggregation, anti-inflammation, hypotension, Diuresis
Cinnamaldehyde	Improves microcirculation, Vasodilation
Tanshinone	Dilates peripheral blood vessels, inhibits myocardial contractility, increases blood flow to the ischemic myocardial zone, reduces cardiac load
Tinglizi	Enhances left ventricular pumping function, Boosts myocardial contractility, regulates blood flow, reduces vascular resistance
Aconite	Improves blood circulation, Boosts myocardial contractility
Ginger Decoction	Boosts myocardial contractility, augments cardiac output, improves blood circulation
Glycyrrhetinic acid	Inhibits myocardial hypertrophy
paeonol	Improves hemodynamics, exerts anti-inflammatory effects, inhibits apoptosis
Ginkgo biloba extract	Exerts antioxidant effects, inhibits myocardial remodeling

4.6 Traditional Chinese Medicine Decoction for HF

Li Yujing et al. demonstrated that modified Baoyuan Decoction significantly improved cardiac functional capacity, alleviated clinical symptoms, and enhanced quality of life in HF patients without adverse reactions [27]. Guo Leilei et al. found that modified Zhenwu Decoction effectively ameliorated CHF symptoms, reduced heart failure severity, enhanced cardiac performance, potentiated myocardial function, and controlled disease progression [28]. Hu Shuangxuan et al. reported that modified Linggui Zhugan Decoction delayed ventricular remodeling, augmented cardiac pumping function, and regulated coronary blood flow in HF [29]. Yu Mei et al. revealed that Shenfu Decoction improved cardiac function through heart rate control, downregulation of inflammatory cytokines, suppression of inflammatory responses, and reduction of brain natriuretic peptide levels [30]. Sini Decoction exerts therapeutic effects on CHF via multiple mechanisms including antioxidant effects, gut microbiota modulation, apoptosis regulation, endoplasmic reticulum stress mitigation, RAAS inhibition, myocardial energy metabolism optimization, and neuroendocrine factor suppression [31]. (Refer to Table 2 for details).

Table 2: Mechanism of action of traditional Chinese medicine decoction in HF

Traditional Chinese medicine decoction	Mechanism of action
BY	Enhances cardiac function, alleviates symptoms, and improves quality of life
ZW	Ameliorates symptoms, reduces heart failure severity, enhances cardiac performance, and potentiates myocardial function
LGZS	Inhibits ventricular remodeling, augments cardiac pumping function, and regulates coronary blood flow
SF	Controls heart rate, downregulates inflammatory cytokines, suppresses inflammatory responses, reduces brain natriuretic peptide levels, and thereby improves cardiac function
SN	Inhibits the RAAS and modulates myocardial energy metabolism

4.7 Proprietary Chinese Medicine for HF

Research by Sun Yang et al. demonstrated that Qishen Yiqi Dripping Pills effectively reduce blood lipids, stabilize plaques, improve microcirculation, exert anti-fibrotic and anti-inflammatory effects, and protect vascular endothelial cells. They also enhance coronary blood supply and oxygen delivery. This formulation shows significant therapeutic efficacy in treating dilated cardiomyopathy, pulmonary heart disease, coronary heart disease, diabetic microvascular complications, and idiopathic pulmonary fibrosis [32]. Concurrently, Hu Yaodong et al. found that Qili Qiangxin Capsules not only alleviate clinical symptoms and improve the clinical effectiveness of chronic heart failure but also protect the vascular endothelium, reduce platelet aggregation, and improve hemodynamics [33]. Furthermore, Fan Ruiyun et al. reported that Yangxinshi positively enhances exercise tolerance, improves cardiac function, and increases the quality of life for patients [34]. (Refer to Table 3 for details).

Table 3: Mechanisms of Action of Chinese Patent Medicines in HF

Proprietary Chinese medicine	Mechanism of action
QSYQ	lowering lipids and stabilizing plaques, improving microcirculation, exerting anti-fibrotic and anti-inflammatory effects, protecting vascular endothelial cells, and improving coronary blood supply and oxygen delivery.
QLQX	Alleviating symptoms, protecting the vascular endothelium, inhibiting platelet aggregation, and improving hemodynamics
YXS	Enhancing patient exercise tolerance, improving cardiac function, and increasing patient quality of life

4.8 Injection for HF

Research by Sun Dong et al. demonstrated that Astragalus Injection corrects hemodynamic abnormalities in heart failure patients, reduces various ventricular remodeling indicators, improves myocardial function, and thereby delays the progression of chronic heart failure [35].

Li Chao et al. found that Astragalus Injection improves ventricular remodeling and inhibits myocardial hypertrophy [36].

Hu Haiyin et al. indicated that Shengmai Injection mitigates inflammatory responses, improves hemodynamic parameters, enhances humoral immunity, inhibits angiotensin II activity, reduces left ventricular hypertrophy, protects vascular endothelium and myocardial cells, and improves cardiac function [37].

Guo Guiying reported that Shenmai Injection reduces cardiac load, decreases BNP and angiotensin levels, and improves cardiac function [38].

Zhai You et al. discovered that Shenmai Injection lowers myocardial injury markers and inflammatory cytokine levels, reduces myocardial fibrosis, and significantly enhances cardiac function indicators in rats with chronic heart failure [39].

Zhou Xiaochao et al. demonstrated that Xinmailong Injection improves myocardial cell metabolism and diastolic function, ameliorates ventricular remodeling, reduces cardiac load, and protects the myocardium [40]. (Refer to Table 3 for details).

Table 4: Mechanism of action of injection solution in HF

Injection	Mechanism of action
Astragalus Injection	corrects hemodynamics and improves cardiac function
	inhibits myocardial remodeling
Shengmai Injection	mitigating inflammatory responses, improving hemodynamics, inhibiting angiotensin II activity, and reducing cardiac load
Shenmai Injection	mitigating inflammatory responses and reducing myocardial fibrosis
Xinmailong Injection	improving myocardial cell metabolism and diastolic function, ameliorating ventricular remodeling, and reducing cardiac load

5. Brief Summary

HF, representing the end stage of progression for numerous cardiovascular diseases, constitutes a major challenge within the field of cardiovascular therapeutics. Traditional Chinese Medicine approaches to treating heart failure not only ameliorate clinical symptoms in patients but also mitigate associated adverse drug effects. Although modern pharmacological techniques and methodologies have enabled in-depth analysis of the active components within Chinese herbal medicines, critical scientific questions concerning traditional Chinese medicine role in preventing and treating heart failure remain to be elucidated. Key unresolved issues include the precise identification of therapeutic targets for traditional Chinese medicine interventions in heart failure, and the need to further delineate the specific molecular signaling pathways through which traditional Chinese medicine regulates the initiation and progression of the condition.

References

[1] LI Shijun. Research Advances in Epidemiology, Pathophysiology, and Prognosis of Heart Failure in the Elderly[J]. Chinese Journal of Geriatric Heart, Brain and Vessel Diseases, 2021, 23(03):318-320.

[2] TIAN Zhuang; ZHANG Shuyang. Interpretation on Chinese Guidelines for the Diagnosis and Treatment of Heart Failure 2024[J]. Medical Journal of Peking Union Medical College Hospital, 2024, 15(4):801-806

[3] Baczko I, Leprán I, Kiss L, et al. Future perspectives in the pharmacological treatment of atrial fibrillation and ventricular arrhythmias in heart failure. Curr Pharm Des. 2015;21(8):1011-29.

[4] Bozkurt B, Nair AP, Misra A, et al. Fedson S. Neprilysin Inhibitors in Heart Failure: The Science, Mechanism of Action, Clinical Studies, and Unanswered Questions. JACC Basic Transl Sci. 2022 Sep 7;8(1):88-105.

[5] He Y, Huang W, Zhang C, et al. Energy metabolism disorders and potential therapeutic drugs in heart failure. Acta Pharm Sin B. 2021 May;11(5):1098-1116.

[6] Bertero E, Maack C. Metabolic remodelling in heart failure. Nat Rev Cardiol. 2018 Aug;15(8):457-470.

[7] Brown DA, Perry JB, Allen ME, et al. Expert consensus document: Mitochondrial function as a therapeutic target in heart failure. Nat Rev Cardiol. 2017 Apr; 14(4): 238-250.

[8] Alam P, Maliken BD, Jones SM, et al. Cardiac Remodeling and Repair: Recent Approaches, Advancements, and Future Perspective. Int J Mol Sci. 2021 Dec 3; 22(23):13104.

[9] Sekaran NK, Crowley AL, de Souza FR, et al. The Role for Cardiovascular Remodeling in Cardiovascular Outcomes. Curr Atheroscler Rep. 2017 May;19(5):23.

[10] Leancă SA, Crișu D, Petriș AO, et al. Left Ventricular Remodeling after Myocardial Infarction: From Physiopathology to Treatment. Life (Basel). 2022 Jul 24;12(8):1111.

[11] YAN Junchen, YANG Zhenyu, ZHONG Weibo, et al. The Application of Wind-Dispelling Herbs (Feng Yao) in the Treatment of Heart Failure[J]. China Journal of Chinese Medicine, 1-10[2025-07-17].

[12] Ye Minyi, Jiang Huiyi, Pan Yandong. Effects of acupuncture at back-shu and front-mu acupoints combined with western medicine in the treatment of chronic heart failure and its effect on heart failure markers and heart rate variability[J]. Clinical Journal Of Chinese Medicine, 2020, 12(18):28-31.

[13] WANG Shuang. The Influence of Massage Combined with Emotional Nursing on Psychological Status and Cardiac Function of Patients with Chronic Heart Failure[J]. Henan Traditional Chinese Medicine, 2019, 39(03): 450-452.

[14] PAN Lin, LIU Yinghua, DENG Lushuang. Effect of acupoint application combined with Tai Chi on cardiac function and ability of daily living in patients with chronic heart failure[J]. Chinese Nursing Research, 2023, 37(22):4123-4125.

[15] GUO Wenjing, MA Jun, LI Qiulai. Clinical Observation of Baduanjin and Western Medicine in Treating Chronic Heart Failure[J]. China's Naturopathy, 2024, 32(03):65-67

[16] LIU Xiaojuan, HUANG Jinliang, LI Ruiming, et al. Cardiac rehabilitation of patients with chronic heart failure based on Wuqinxi intervention[J]. Clinical Journal of Chinese Medicine, 2022, 14(33):32-34.
[17] DAI Changwen, ZHENG Kaite, LI Jian. Acupoint Application Combined with Auricular Acupressure in Elderly Chronic Heart Failure: Therapeutic Effects and Impact on Left Ventricular Function[J]. Journal of External Therapy of Traditional Chinese Medicine, 2022, 31(02): 42-43.
[18] Liu J, Zhang Q, Li R L, et al. The traditional uses, phytochemistry, pharmacology and toxicology of Cinnamomiramulus: a review. J PharmPharmacol, 2020, 72(3):319-342.
[19] XU Ming. Antihypertensive Effect and Mechanism of Cinnamaldehyde in Anesthetized Rats: An Experimental Study[D]. Air Force Medical University, 2006.
[20] XU Ming; ZHANG Jing; QIU Jian-ping, et al. Research Progress on Processing Methods and Pharmacological Effects of Tinglizi [J]. Guiding Journal of Traditional Chinese Medicine and Pharmacy, 2021, 27(10):132-137.
[21] JIAO Mingjie, LI Xinxin, LIU Shuming, et al. Effect and mechanism of Zhongjing's Paofuzi on chronic heart failure [J]. Drug Evaluation Research, 2022, 45(10): 1980-1991.
[22] DONG Yaorong. Experimental Study on the Effect of Aconite Decoction on Ventricular Remodeling in Rats with Chronic Heart Failure. Shanghai Municipality, Shanghai Hospital of Traditional Chinese Medicine, 2009-03-19.
[23] ZHOU Jing, YANG Weiping, LI Yinglong, et al. Study on the Effect of Guizhou Ginger Decoction on the Hemodynamics of Acute Heart Failure Rats[J]. Yunnan Journal of Traditional Chinese Medicine and Materia Medica, 2011, 32(03):45-47+2.
[24] Wang L, He Y, Zhang Y, et al. Effects of Active Components of Fuzi and Gancao Compatibility on Bax, Bcl-2, and Caspase-3 in Chronic Heart Failure Rats. Evid Based Complement Alternat Med. 2016; 2016: 7686045.
[25] Chen C, Liu S, Cao G, et al. Cardioprotective Effect of Paeonol on Chronic Heart Failure Induced by Doxorubicin via Regulating the miR-21-5p/S-Phase Kinase-Associated Protein 2 Axis. Front Cardiovasc Med. 2022 Jul 5; 9: 695004.
[26] Karmazyn M, Gan XT. Inhibition of Myocardial Remodeling and Heart Failure by Traditional Herbal Medications: Evidence from Ginseng and ginkgo biloba. Rev Cardiovasc Med. 2023 Jul 21; 24(7): 212.
[27] LI Yujing. Baoyuan Decoction for Chronic Heart Failure with Qi Deficiency and Blood Stasis: Integrated Clinical and Network Pharmacology Study[D]. Shandong University of Traditional Chinese Medicine, 2024.
[28] GUO Leilei, PENG Li, SHU Hua, et al. Effect of Zhenwu Decoctionon Chronic Heart Failure Due to Yang Deficiency and Water Flooding and Its Influence on Levels of IL-1 and TNF-α[J]. Chinese Archives of Traditional Chinese Medicine, 2021, 39(7):192-195.
[29] HU Shuangxuan, LIXiangzhong. Linggui Zhugan Decoction for Elderly Chronic Heart Failure: Clinical Efficacy and Effects on Left Ventricular Ejection Fraction[J]. Heilongjiang Journal of Traditional Chinese Medicine, 2020, 49(05):10-11.
[30] YU Mei, LIU Zhaolong, Ma Lijuan. et al. Effects of Jiawei Shenfu Decoction on B- type Natriuretic Peptide, C- creative Protein, Tumor Necrosis Factor- α in Patients with Chronic Heart Failure of Heart Yang Deficiency Syndromes[J]. Chinese Archives of Traditional Chinese Medicine, 2016, 34(03):664-666.
[31] LIU Mengjun, LU Tao, QIN Caimeng. et al. Effect of Sini Decoction Combined with Metformin on Glucose Metabolism and Lipid Metabolism in Patients with Type 2 Diabetes Mellitus[J]. World Chinese Medicine, 2022, 17(18):2619-2622+2627.
[32] SUN Yang, ZHU Mingjun, LI Bin. et al. Discussion on the Current Situation of Qishen Yiqi Dropping Pills in the Treatment of Heart Failure[J]. Chinese Medicine Modern Distance Education of China, 2019, 17(3): 54-56.
[33] HU Yaodong, YANG Yibo, TIAN Min. Clinical Study on Qili Qiangxin Capsule in Treatment of Chronic Heart Failure[J]. Chinese Archives of Traditional Chinese Medicine, 2024, 42(5):36-40.
[34] FAN Ruiyun, LI wenge, LIU Yanmin, et al. Yangxinshi Tablets as Adjunctive Therapy for Cardiac Dysfunction: A Comparative Clinical Study on Therapeutic Efficacy [J]. People's Military Surgeon, 2020, 63(8): 789-792.
[35] SUN Dong. Effects of Huangqi Injection on Ventricular Remodeling in Chronic Heart Failure Patients: A Clinical Mechanistic Analysis[J]. Cardiovascular Disease Electronic Journal of Integrated Traditional Chinese and Western Medicine, 2020, 8(34):191+195.
[36] LI Chao, YU Hanqiao, CHEN Yun, et al. Huangqi Injection Modulates Cardiac Architecture in Chronic Heart Failure Rats: An Experimental Study on Structural Remodeling[J]. Journal of Emergency in Traditional Chinese Medicine, 2017, 26(10):1772-1774.
[37] HU Haiyin, JI Zhaochen, WANG Hucheng. et al. Efficacy of Shengmai Injection in theTreatment of Chronic Heart Failure: Systematic Review[J]. World Journal of Integrated Traditional and Western Medicine, 2020, 15(5):808-814.
[38] GUO Guiying, WANG Jingxun. Shengmai Injection Modulates Angiotensin II, BNP, and Ventricular Remodeling in Chronic Heart Failure: Clinical Evidence of Multitarget Regulation[J]. Pharmacology and Clinics of Chinese Materia Medica, 2015, 31(3):136-138
[39] ZHAI You, LIU Siyuan, CHEN Shanfu. et al. Effects of four traditional Chinese medicine injections on improving chronic heart failure in rats[J]. Chinese Traditional and Herbal Drugs, 2021, 52(14):4248-4254.
[40] ZHOU Xiaochao, XU Lin. Effect of Xinmailong Injection on Cardiac Function and Inflammat ory Factors in Patients with Chronic Heart Failure[J]. Clinical Journal of Traditional Chinese Medicine, 2020, 32(2): 344-346.