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Observation on the Efficacy of Vericiguat Combined with Xinmailong Injection in the Treatment of Chronic Heart Failure

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Abstract

Objective: To explore the efficacy of vericiguat combined with Xinmailong Injection in the treatment of chronic heart failure (CHF). **Methods:** A total of 70 CHF patients admitted to the hospital from September 2023 to September 2025 were divided into the control group (35 cases) and the combined group (35 cases) according to the random number table method. Both groups received the new quadruple therapy; the control group was additionally treated with Xinmailong Injection, while the combined group was treated with vericiguat combined with Xinmailong Injection. Cardiac function indicators, 6-minute walk test (6MWT) results, and N-terminal pro-brain natriuretic peptide (NT-proBNP) levels were compared between the two groups. **Results:** Compared with the control group, the combined group had significantly lower left ventricular end-diastolic diameter (LVEDD), left ventricular end-systolic diameter (LVESD), and NT-proBNP levels after treatment, as well as significantly higher left ventricular ejection fraction (LVEF) and 6MWT results (all $P < 0.05$). **Conclusion:** Vericiguat combined with Xinmailong Injection can improve cardiac function and enhance exercise tolerance in CHF patients.

Keywords

Vericiguat; Xinmailong Injection; Chronic Heart Failure; Efficacy

Chronic heart failure, as the terminal manifestation of cardiovascular diseases, is characterized by high morbidity, high hospitalization rate, and high mortality, seriously threatening patients' quality of life [1]. Its pathophysiological mechanisms involve excessive activation of the neuroendocrine system, ventricular remodeling, and myocardial energy metabolism disorders, leading to progressive decline in cardiac pumping function [2]. Although the "new quadruple" regimen has become the cornerstone of standard treatment, some patients still suffer from poor symptom control and recurrent hospitalizations, highlighting the urgent need to explore more optimal combination strategies.

Xinmailong Injection, an original small-molecule bioactive peptide preparation in China, exerts cardiotonic, diuretic, vasodilatory, and anti-myocardial oxidative damage effects. Its multi-target intervention mechanism can improve myocardial energy metabolism and inhibit excessive activation of neurohormones [3]. Vericiguat, the world's first soluble guanylate cyclase (sGC) stimulator, enhances the cGMP signaling pathway independently of nitric oxide, directly dilates blood vessels, inhibits myocardial fibrosis and ventricular remodeling, and significantly reduces the risk of cardiovascular death or heart failure hospitalization [4].

Through a prospective controlled trial, this study observed the efficacy of vericiguat combined with Xinmailong Injection in CHF patients, aiming to provide an evidence-based basis for optimizing heart failure treatment regimens and promoting the innovative development of integrated traditional Chinese and Western medicine treatment models. The report is as follows.

1. Materials and Methods

1.1 General Information

A total of 70 CHF patients admitted to the hospital from September 2023 to September 2025 were divided into the control group (35 cases) and the combined group (35 cases) according to the random number table method. In the control group, the age range was 40-75 years (mean 65.37 ± 3.25 years), and the disease duration was 1-8 years (mean 4.13 ± 0.75 years); there were 14 males and 21 females; New York Heart Association (NYHA) functional classification was Grade II in 9 cases, Grade III in 21 cases, and Grade IV in 5 cases. In the combined group, the age range was 40-75 years (mean 64.89 ± 3.18 years), and the disease duration was 1-8 years (mean 4.32 ± 0.80 years); there were 16 males and 19 females; NYHA classification was Grade II in 8 cases, Grade III in 23 cases, and Grade IV in 4 cases. There were no significant differences in baseline data between the two groups ($P > 0.05$), indicating comparability. This study was approved by the Medical Ethics Committee.

1.2 Inclusion and Exclusion Criteria

Inclusion criteria: Consistent with the diagnostic criteria for chronic heart failure [5]; NYHA functional classification of II-IV; Patients or their family members fully understood the treatment and research process and signed the informed consent form.
Exclusion criteria: Patients with comorbidities such as hypermetabolic diseases, hematological diseases, liver and kidney dysfunction, autoimmune diseases, severe endocrine diseases, malignant tumors, or other cardiac diseases; Pregnant or lactating women; Patients with severe cognitive impairment or mental illness.

1.3 Methods

Both groups received the new quadruple therapy: Sacubitril/valsartan (Jiangsu Wango Pharmaceutical Co., Ltd.; National Drug Approval Number: H20253445; Specification: 50mg): 50mg each time, twice a day. Dapagliflozin (Tiandihengyi Pharmaceutical Co., Ltd.; National Drug Approval Number: H20255293; Specification: 10mg): 10mg each time, once a day. Bisoprolol (Beijing Jincheng Tai'er Pharmaceutical Co., Ltd.; National Drug Approval Number: H20253940; Specification: 5mg): 1.25mg each time, once a day. Spironolactone (Guangzhou Kanghe Pharmaceutical Co., Ltd.; National Drug Approval Number: H44023416; Specification: 20mg): 20mg each time, once a day. The treatment course was 7 consecutive days.

The control group was additionally treated with Xinmailong Injection, and the combined group was treated with vericiguat combined with Xinmailong Injection: Xinmailong Injection (Yunnan Tengyao Pharmaceutical Co., Ltd.; National Drug Approval Number: Z20060443; Specification: 2ml:100mg): Administered at a dose of 5-10mg/kg, for 7 consecutive days. Vericiguat (Bayer AG; National Drug Approval Number: HJ20220051; Specification: 5mg): 5mg each time, once a day, for 7 consecutive days.

1.4 Observation Indicators

Cardiac function indicators: Color Doppler echocardiography was performed before and after treatment to measure LVEDD, LVESD, and LVEF.
6MWT and NT-proBNP: The 6MWT was completed before and after treatment under the full supervision of trained medical staff; the test was stopped immediately if the patient experienced severe discomfort to ensure safety. Fasting venous blood (3ml) was collected before and after treatment, centrifuged at 3000r/min to obtain the supernatant, and NT-proBNP was detected by electrochemiluminescence.

1.5 Statistical Analysis

SPSS 26.0 software was used for data analysis. Measurement data conforming to normal distribution were expressed as (mean ± standard deviation) and compared by independent sample t-test; counting data were expressed as rate (%) and compared by χ^2 test. A P value < 0.05 was considered statistically significant.

2. Results

2.1 Comparison of Cardiac Function Indicators Between the Two Groups

Compared with the control group, the combined group had significantly lower LVEDD and LVESD levels, and significantly higher LVEF after treatment (all $P < 0.05$) (see Table 1).

Table 1. Comparison of Cardiac Function Indicators Between the Two Groups (mean ± SD)

Group	LVEDD (mm)		LVESD (mm)		LVEF (%)	
	Before Treatment	After Treatment	Before Treatment	After Treatment	Before Treatment	After Treatment
Combined group (n=35)	62.13 ± 3.27	48.72 ± 3.16*	46.54 ± 3.72	36.93 ± 2.61*	37.85 ± 2.34	51.14 ± 4.38*
Control group (n=35)	61.98 ± 4.62	52.64 ± 3.57*	46.39 ± 3.35	41.86 ± 3.77*	38.05 ± 3.42	45.83 ± 3.87*
t value	0.157	4.864	0.177	6.361	0.286	4.375
P value	0.876	0.000	0.860	0.000	0.776	0.000

Note: * indicates comparison with before treatment, $P < 0.05$.

2.2 Comparison of 6MWT and NT-proBNP Between the Two Groups

Compared with the control group, the combined group had significantly lower NT-proBNP levels and significantly higher 6MWT results after treatment (both $P < 0.05$) (see Table 2).

Table 2. Comparison of 6MWT and NT-proBNP Between the Two Groups (mean ± SD)

Group	6MWT (m)		NT-proBNP (pg/ml)	
	Before Treatment	After Treatment	Before Treatment	After Treatment
Combined group (n=35)	254.64 ± 23.87	458.74 ± 33.19*	663.27 ± 23.82	276.92 ± 22.41*
Control group (n=35)	257.58 ± 24.65	392.37 ± 31.86*	659.96 ± 24.32	346.76 ± 23.17*
t value	0.507	8.535	0.575	12.818
P value	0.614	0.000	0.567	0.000

Note: * indicates comparison with before treatment, $P < 0.05$.

3. Discussion

Chronic heart failure is a clinical syndrome caused by abnormal cardiac structure and function, resulting in cardiac output insufficient to meet the body's metabolic needs, mainly manifested as dyspnea, fatigue, and fluid retention [6]. An effective comprehensive treatment regimen can not only relieve clinical symptoms, improve exercise tolerance and quality of life, but also delay disease progression, reduce rehospitalization rate and all-cause mortality, which is decisive for improving patients' long-term outcomes.

The results of this study showed that compared with the control group, the combined group had significantly lower LVEDD, LVESD, and NT-proBNP levels, and significantly higher LVEF and 6MWT results after treatment (all $P < 0.05$). CHF patients generally have endothelial dysfunction and increased oxidative stress, leading to decreased bioavailability of nitric oxide (NO), which in turn reduces the sensitivity of soluble guanylate cyclase (sGC) to NO and insufficient production of cyclic guanosine monophosphate (cGMP) [7]. As a key second messenger regulating cardiovascular function, the lack of cGMP exacerbates myocardial fibrosis, myocardial hypertrophy, and vasoconstriction [8].

Even in an environment with low NO bioavailability, vericiguat can directly bind to sGC, enhance its activity, and promote the production of cGMP [9]. It can also stabilize the binding between sGC and NO, significantly enhancing the response of sGC to limited NO in the body. Through these two effects, vericiguat can effectively increase intracellular cGMP levels [10]. Elevated cGMP levels can inhibit pathological hypertrophy and fibrosis, improve myocardial compliance, induce vasodilation of vascular smooth muscle, and reduce cardiac preload and afterload. Meanwhile, it can promote natriuresis and diuresis, reducing volume load. These effects collectively reverse ventricular remodeling and improve hemodynamics from a biological mechanism perspective, which is reflected in the

improvement of overall cardiac systolic and diastolic function and a significant decrease in NT-proBNP levels reflecting cardiac wall stress. Exercise tolerance is improved due to increased cardiac output and enhanced tissue perfusion.

In conclusion, vericiguat combined with Xinmailong Injection can improve cardiac function and enhance exercise tolerance in CHF patients.

References

[1] Senni M, Alemayehu WG, Sim D, et al. Efficacy and safety of vericiguat in patients with heart failure with reduced ejection fraction treated with sacubitril/valsartan: insights from the VICTORIA trial. Eur J Heart Fail. 2022;24(9):1614-1622.

[2] Tian DK, Su XL, Li W, et al. Evaluation of the therapeutic effect of sacubitril valsartan sodium on heart function and myocardial fibrosis indicators in heart failure patients with decreased ejection fraction in Qinghai region. J Clin Cardiol. 2022;38(2):137-141.

[3] Tian YZ, Cui JT, Zhao JF, et al. Effect of Xinmailong Injection combined with bisoprolol fumarate on the rate of change of NT-proBNP in patients with heart failure after acute myocardial infarction and its predictive value for prognosis. Chin J Integr Med Cardio-Cerebrovasc Dis. 2024;22(16):2995-3000.

[4] Zhu K, Zhao JT, Li JJ. Clinical study on the effect of vericiguat combined with recombinant human brain natriuretic peptide in the treatment of HFrEF complicated with atrial fibrillation. Hainan Med J. 2024;35(16):2309-2315.

[5] Chinese Society of Cardiology Heart Failure Group, Chinese College of Physicians Heart Failure Professional Committee, Editorial Board of Chinese Journal of Cardiology. Guidelines for the diagnosis and treatment of heart failure in China 2018. Chin J Cardiol. 2018;46(10):760-789.

[6] Chatur S, Claggett BL, Vardeny O, et al. Sacubitril/valsartan and loop diuretic requirement in heart failure with preserved ejection fraction in the PARAGON-HF trial. Eur J Heart Fail. 2023;25(1):87-94.

[7] Huang LF, Da YX, Zhou S, et al. Efficacy of vericiguat combined with recombinant human brain natriuretic peptide in patients with heart failure with reduced ejection fraction. J Clin Med Pract. 2024;28(22):67-70,77.

[8] Dan SP, Luo SX. Effect of vericiguat on cardiac function, serum sST2 and BNP in patients with HFrEF. Chongqing Med. 2024;53(6):877-882.

[9] Wang JM, Long JN, Fan ZP, et al. Efficacy of vericiguat in the treatment of heart failure after acute myocardial infarction in elderly patients. Chin J Drug Appl Monit. 2025;22(3):407-410.

[10] He JB, Liu LH, Yang ZN. Efficacy of vericiguat combined with Qiliqiangxin Capsules in the treatment of chronic heart failure and its effect on serum NT-proBNP levels. J Diffic Compl Cas. 2025;24(9):1040-1044.