

Clinical Research Progress of Gualou Xiebai Banxia Decoction in the Treatment of Chest Stuffiness

Panpan He^{1,a}, Zhengfang Zhou^{1,b}, Peng Lei^{2,c,*}

¹Shaanxi University of Chinese Medicine, Xianyang, 712046, China

²Shaanxi Provincial People's Hospital, Xi'an, Shaanxi, 710068, China

^a1594184383@qq.com, ^b1531652654@qq.com, ^cleipengml163.com

*Corresponding author

Keywords: Gualou Xiebai Banxia decoction, Chest stuffiness, Coronary heart disease, Clinical application

Abstract: Coronary heart disease (CHD) is a kind of common diseases, and its incidence increases with the change of people's lifestyle. In Jingui Yaolue, Gualou Xiebai Banxia decoction is a commonly used medicine for treating chest pain in clinic. With the rapid development of science and technology and the remarkable improvement of medical level, the pharmacological research, efficacy exploration and clinical application of the medicinal components of this prescription are helpful to improve the therapeutic effect of chest stuffiness. The report^[1] shows that the incidence and mortality of cardiovascular diseases (CVD) in China are still increasing, and there has not yet been a turning point for the reduction of the burden of disease. At present, stroke, coronary heart disease, and heart failure still account for a large proportion of CVD patients in China. Coronary heart disease (CHD) is short for coronary atherosclerotic heart disease (CHD), which belongs to the category^[2] of chest stuffiness in traditional Chinese medicine. Chest stuffiness is a clinical symptom mainly manifested as chest discomfort or pain, and in severe cases, chest and back pain may be felt. It is accompanied by difficulty breathing, and even affect sleep. In mild cases, patients may experience a feeling of tightness or mild discomfort in the chest, while in severe cases, the main manifestation is pain in the chest and back. In the Han Dynasty, Zhang Zhongjing put forward the name of "chest obstruction" for the first time in his Jin-Guiyao Lue (Synopsis of Prescriptions of the Golden Prescriptions), and recorded that Gualou Xiebai Banxia decoction was used to treat chest obstruction, pain, shortness of breath, and pulse syndrome. The composition of the decoction is Gualou, Xiebai, Pinellia, and liquor.

1. Progress in pharmacological research.

1.1 Pharmacological studies of Trichosanthes

Trichosanthis fructus is a traditional Chinese medicine that plays an important role in Chinese culture. Trichosanthis fructus has a wide range of pharmacological activities, including clearing heat, removing phlegm, relieving chest lumps, and moistening dry intestinal wall. In addition to the above

properties, *Trichosanthis fructula* has been shown to enhance myocardial function and prevent thrombosis, thus helping to maintain the health^[3] of the body. Yang Fan used TCMSP technology to identify the material basis of drug effect and target, and combined with UniProt database, the relevant information of target genes and related diseases was obtained. Gene ontology (GO) enrichment analysis of active component protein group and Kyoto Encyclopedia of Genes and Genomes (Kyoto Encyclopedia of Genes and Genomes) enrichment analysis of target proteins were performed using software and tools. A regulatory pathway was successfully established, which was closely related to multiple biological information pathways, such as oxidative stress and inflammatory response, and also to six important systems, such as cardiovascular disease and cancer. This pathway may have a profound impact on the prevention and treatment of many diseases.^[4] Thus, the material basis of the medicinal effect of *T. kirilowii* in tumor, immunity, cardiovascular and other aspects can be clarified. The basic theory of *Trichosanthes trichosanthis* for its pharmacological effects on tumor, immunity, and cardiovascular and vascular diseases was described.

1.2 Pharmacological studies of Xiebai

Xie^[5] is a traditional Chinese medicine used to treat chest stuffiness and heartache. Xiebai is warm in nature and has a spicy and bitter taste. It can warm the middle jiao, dispel Yang qi, dispel qi, promote blood circulation and relieve pain. Jia Zijun^[6] used network pharmacology to explore the mechanism of Xiebai in the treatment of myocardial ischemia-reperfusion injury. It was found that Xiebai could treat myocardial ischemia-reperfusion injury by regulating fluid shear stress, oxidative stress and inflammatory response. The results show that Xiebai has a multi-component, multi-point and multi-pathway therapeutic mechanism.

1.3 Pharmacological studies on Pinellia sp

Pinellia is a dry block of the Araceae family that contains large amounts of alkaloids, amino acids, and pinellia proteins, among other components. In traditional Chinese medicine (TCM), Pinellia is commonly used for the treatment of excessive cough and phlegm, vomiting and nausea, numbness in the chest cavity, and scrofula and phlegm. These herbal ingredients have unique pharmacological effects and can effectively relieve and treat various symptoms^[7]. Guo Xiangyun et al. found that Pinellia can significantly reduce triglyceride and low-density lipoprotein effects^[8]. He Huakang found that the use of Pinellia can play a role^[9] in regulating arrhythmia and dyslipidemia.

2. Research progress on clinical application of Gualouxiebai Banxia decoction

2.1 Application in the treatment of coronary heart disease

Coronary heart disease, also known as ischemic cardiomyopathy, is a heart disease caused by coronary atherosclerosis. Coronary heart disease (CHD) is an important disease affecting the health of the heart. Its occurrence is related to coronary atherosclerosis, leading to ischemia, hypoxia or necrosis of the heart muscle, which in turn leads to heart disease. This disease belongs to the category of "chest stuffiness" in traditional Chinese medicine. Zhang LAN et al. showed that using Gualou Xiebai Banxia decoction to treat chest obstruction can promote blood flow and lipid metabolism, thereby slowing the formation^[10] of blood clots. Yan Xiaoli's study showed that for those people with high risk of coronary heart disease, if they can be combined with conventional western medicine and supplemented with Gualou Xiebai Banxia decoction granules, better therapeutic effects will be achieved, and the quality of life of patients can be significantly improved. This combination of traditional Chinese and western medicine is worthy of further research and promotion^[11].

2.2 Application in the treatment of myocardial infarction

Acute myocardial infarction (AMI) is a common type of critical and severe coronary heart disease, which is usually caused by the interaction of thrombosis and stenosis, and is an important cause^[12] of serious consequences such as malignant arrhythmia, cardiogenic shock and even sudden death. A study by Zhou Jing showed that phlegm dampness syndrome accounted for a large proportion in patients with acute myocardial infarction. In view of this situation, in the treatment process, the use of Gualou Xiebai Banxia decoction has shown significant effect. This drug can significantly improve the systemic symptoms of patients with acute myocardial infarction after reperfusion treatment, and can significantly accelerate the recovery process of patients. In simple terms, it means that the use of Gualou Xiebai Banxia Decoction can effectively improve the symptoms of AMI patients and help them recover faster. The results of this study provide new ideas and methods for clinical treatment, which has very important clinical application value^[13]. Zhang Xuelan's study found that in the treatment of patients with acute myocardial infarction, the combined use of Gualou Xiebai Banxia decoction and conventional western medicine can improve the total effective rate of treatment, and the effect of this combined treatment is better than the simple use of conventional western medicine. This study suggests that in addition to conventional western medicine treatment, traditional Chinese medicine Gualou Xiebai Banxia decoction can also be considered for the treatment of acute myocardial infarction. Therefore, in the treatment of acute myocardial infarction, the combination of Gualou Xiebai Banxia decoction and conventional western medicine can be considered to improve the total effective rate of treatment and the prognosis^[14] of patients.

2.3 Application in the treatment of chronic heart failure

Chronic heart failure (CHF) is a complex and serious clinical disease, which has various etiologies and involves changes in cardiac structure and function. A variety of factors may cause this disease, including genetics, age, hypertension, diabetes, coronary heart disease, etc. These factors may lead to a decrease in the blood pump volume of the ventricle, which cannot meet the metabolic needs of the body. At this time, the heart is in a stage of insufficiency and decompensation, which is unable to work properly to meet the body's needs. Patients may experience breathing difficulties, fatigue, edema and other symptoms, which can even lead to death in severe cases. Therefore, for patients with chronic heart failure, early diagnosis and timely treatment are essential^[15]. Traditional Chinese medicine believes that the pathogenesis of chronic heart failure is the deficiency of heart qi and the stagnation of water. Therefore, the treatment should take the method of warming Yang and purifying water. Zhenwu Decoction, a classic prescription in Shanghan Lun (Treatise on Febrile Diseases), has the effect of warming Yang and promoting water, and can be used to treat this type of chronic heart failure. In this view, Yang deficiency and water are considered to be a common manifestation of chronic heart failure, and the blockage of water and blood stasis caused by heart qi deficiency is also the core of the disease. Therefore, the treatment strategy should be based on warming Yang and denting^[16]. On the basis of conventional western medicine, Zhenwu decoction combined with Gualou Xiebai Banxia decoction is used in the treatment of generalized heart failure with Yang deficiency and water, showing significant curative effect. This regimen can significantly reduce the levels of serum BNP and hs-cTnT, effectively improve the heart function, and is safe and reliable. It is an ideal regimen for the treatment of this disease.

2.4 Application in treatment of unstable angina pectoris

Unstable angina pectoris is a common and complex disease, and its specific etiology is not fully understood at present. This disease often leads to high morbidity and mortality, and poses a serious

threat^[17] to the health and quality of life of patients. In the clinical treatment of western medicine, the main treatment methods include reducing fat, lowering blood pressure, anticoagulation plate agglutination, and stabilizing plaque, etc. This method is relatively single. In the field of prevention and treatment of cardiovascular diseases, traditional Chinese medicine (TCM) has shown outstanding superiority. In one study, Deng Fubao et al. used Gualou Xiebai Banxia decoction to treat patients with unstable angina pectoris. The results showed that the therapy had a significant inhibitory effect on angina attacks, while significantly improving the SAQ score of the patients. They found that Gualou Xiebai Banxia decoction has the effect of activating blood circulation and removing blood stasis, removing phlegm and turbidity, which has a positive significance^[18]. A study by Lv Wei found that the combination of Gualou Xiebai Banxia decoction and conventional western medicine could achieve significant therapeutic effects on patients with unstable angina pectoris. This method can effectively reduce the attack frequency and duration of angina pectoris, and also reduce the occurrence of adverse reactions. This integrated traditional Chinese and western medicine treatment provides a new treatment option^[19] for such patients.

2.5 Application in the treatment of myocardial ischemia

Myocardial ischemia is a disease of myocardial energy metabolism disorder caused by insufficient blood supply to the heart. Once it occurs, it will have adverse effects on the work and survival of patients, resulting in decreased cardiac function, angina pectoris, arrhythmia and other symptoms, and even sudden death^[20] in severe cases. Myocardial ischemia belongs to one of the chest stupendous and painful diseases in traditional Chinese medicine. Zhang Jianmin et al. treated the rats with Gualou Xiebai Banxia decoction by gavage and established a myocardial ischemia model by coronary artery ligation. The experimental results showed that the drug can effectively reduce the content of malondialdehyde (MDA) in serum, has significant resistance to acute myocardial ischemia, and can effectively protect the myocardium^[21].

3. Summary of pharmacological action and clinical application experience of Gualouxiebai Banxia decoction

3.1 Summary of pharmacological action

Gualou Xiebai Banxia Decoction is composed of Radix trichosanthis fructus, Xiebai, Pinelliae rhizoma, liquor and other medicinal materials. Trichosanthes Xie-Bai Banxia Decoction has a cold nature, sweet taste and bitter taste. It has the functions of widening the chest, dispersing knot, clearing heat and removing phlegm, moistening intestine and purging feces. In addition, it can effectively reduce blood lipids, improve myocardial ischemia, and reduce the pain degree and frequency of angina pectoris of coronary heart disease. In general, Gualou Xiebai Banxia decoction is a good prescription^[22] for treating coronary heart disease.

3.2 Clinical application experience summary

A study by Zeng Baohua found that Gualou Xiebai Banxia decoction had significant clinical effect in the treatment of patients with coronary atherosclerotic heart disease. Gualou Xiebai Banxia Decoction can effectively improve the patients' TCM syndrome evaluation and vascular endothelial function, and reduce the use of nitroglycerin and its related adverse reactions. It provides a new idea and method^[23] for the treatment of coronary atherosclerotic heart disease. Jiang Zhengqiang found that in the treatment process, if the use of Gualouxiebai Banxia decoction, it can effectively inhibit the inflammatory response, so as to significantly improve the therapeutic effect. By using this

traditional Chinese medicine decoction, the disease can be better controlled, the pain of patients can be alleviated, and the recovery process^[24] can be accelerated. Kang Yushun's study showed that in the treatment of patients with unstable angina pectoris of phlegm obstruction, the combination of nitroglycerin and Gualou Xiebai Pinxia decoction has a significant effect and can significantly improve blood hemodynamics^[25]. Qian Hua found that the treatment of Gualou Xiebai Banxia decoction combined with Danshen decoction on the basis of Gualou Xiebai Banxia decoction can obtain better therapeutic effect, and has higher application value for patients with coronary heart disease and dyslipidemia. Therefore, in the treatment of patients with unstable angina pectoris, we should choose the most suitable treatment according to the specific situation^[26].

4. The development prospect of Gualouxiebai Banxia decoction in the future research is prospected

Gualou Xiebai Banxia Decoction is a classic empirical prescription in Zhang Zhongjing's *Jingui Yaolue* (Synopsis of the Golden Prescriptions), which has been widely used in modern clinical practice. This prescription is used for the syndrome of chest obstruction, phlegm turbidity and blood stasis. By using the whole prescription together, it can achieve the effect of clearing Yang, clearing phlegm and opening the orifices. Specifically, *Trichosanthes fructus* has the effects of clearing heat and dissipating phlegm, relieving chest and dissipating knot; *Xebai* has the effects of clearing Yang and dissipating cold; *Pinellia rhizoma* has the effects of drying dampness and dissipating phlegm. In addition, this prescription also has the advantages of mild medicinal effect and few side effects, so it is favored in clinical practice. Cardiovascular disease is still a threat to the health of Chinese medicine. Coronary heart disease is the main disease in cardiovascular disease, and Gualou Xiebai Banxia decoction still plays an important role in the treatment of coronary heart disease. As we have entered the new period of comprehensive construction of socialism, the Party and the state have put forward the Healthy China plan and Healthy China Action, indicating that China's health cause has entered a new historical stage of development that promotes the transformation from "disease treatment as the center" to "people's health as the center", censing on the two core aspects of disease prevention and health promotion. Traditional Chinese medicine classic prescriptions, represented by Gualou Xiebai Banxia decoction, will play a greater role in the future. With the continuous development of traditional Chinese medicine (TCM), more and more patients begin to realize the unique efficacy of TCM, and as one of the classic TCM prescriptions, the application of Gualou Xiebai Banxia Decoction will continue to expand. In addition, with the integration of modern medicine and traditional Chinese medicine, the application of Gualou Xiebai Banxia Decoction will continue to be innovated, which will bring better therapeutic effects for more patients.

5. Conclusion

Chest stuffiness is a common clinical disease that threatens people's health and life safety with the improvement of living standards and the change of lifestyle. Its morbidity and mortality are also gradually increasing. The principles of treating chest stuffiness in traditional Chinese medicine are: pay attention to prevention, pay attention to the early intervention of the disease, and seek the root cause of the disease. More than 2000 years ago, the concept of health preservation medicine that prevention is better than cure was put forward in *Huangdi Neijing* (Yellow Emperor's Internal Classic). In the treatment of chest stulosis, traditional Chinese medicine (TCM) will solve the cause from the source by comprehensive use of various methods, including traditional Chinese medicine, acupuncture, and massage, so as to prevent further deterioration of the condition. This kind of thinking of preventing disease, preventing change and seeking root cause fully embodies the wisdom and humanistic care of traditional Chinese medicine in treating diseases. Method in combination with the

number of skills, with the changes of nature, including the movement of the day, with the change of the four seasons, and the corresponding adjustment of diet and daily life. Keep your mind at peace, and don't indulge your emotions too much. Patients should pay attention to the scientific rules of eating, including eating more grains and meat of five animals, avoid excessive eating or eating irregularly, and do not eat one flavor. To prevent coronary heart disease, we should pay attention to the light diet, vegetables, fruits to eat more, avoid too sweet, greasy food, do not eat too full, at the same time, life should be regular. Exercise in moderation and participate in physical exercises for weight control. Patients should actively control the three high diseases, so that blood pressure, blood glucose and blood lipids are always maintained at normal levels. In the prevention and health care of coronary heart disease in daily life, timely diagnosis and treatment is essential. In the treatment of acute diseases, traditional Chinese medicine and western medicine have their own advantages, but in the treatment of chronic diseases, traditional Chinese medicine shows absolute advantages. For the syndrome of chest obstruction, the Gualou Xiebai Banxia decoction is used to clear Yang and dissipate knots, and conduct qi stagnation, and the curative effect is very good. Gualou Xiebai Banxia decoction has been used for the treatment of chest obstruction and phlegm obstruction, and has achieved excellent therapeutic effect. Gualou Xiebai Banxia Decoction is a classic prescription of Zhongjing. It has been widely used by later doctors for treating chest arthralgia with excellent clinical efficacy and has been used for hundreds of years.

References

- [1] Shengshou Hu, Zengwu Wang. Summary of China Cardiovascular Health and disease Report 2022 [J]. *China Cardiovascular Research [J]*, 2023, 21(07):577-600.
- [2] Haijiao Shi, Lili Ding, Yushi Zhou, Mingxue Zhang. Research progress on the pathogenesis of coronary atherosclerotic heart disease combined with stroke [J]. *Journal of Chinese medicine*, 2022, 40 (12): 146-149.
- [3] Haiyan Yan, Chuncai Zou. Advances in pharmacological effects and mechanisms of *Trichosanthis fructula* and prospect of network pharmacology [J]. *International Journal of Pharmaceutical Research*, 2019, 46(02):89-96+115.
- [4] Fan Yang, Xuan Zhang, Huihui Zhang. Exploring the pharmacological effects of the active components of *Psidium guajava* based on network pharmacology [J]. *Chinese Pharmacoeconomics*, 2021, 16(09):92-98.
- [5] Rong Wang, Sihui Bai, Lulu Wang. Advances in chemical constituents and pharmacological effects of *crostemon bunge* [J]. *Wild Plant Resources of China*, 2021, 40(10):73-82.
- [6] Zijun Jia, Qingbing, Yan Zhang. Mechanism of *Trichosanthis fructus*-Xiebai drug against atherosclerosis based on network pharmacology and in vitro experiments [J]. *Journal of Hunan University of Traditional Chinese Medicine*, 2023, 43(11):2061-2070.
- [7] Xiaotong Geng, Qi Liu, Jiaojiao Hua. Advances in chemical constituents and pharmacological effects of *Pinellia pinellia* [J]. *Shanxi Chemical Industry*, 2023, 43(09):53-54+61.
- [8] Xiaochong Huang, Wei Yin. Poets in the field of *Pinellia sinensis* [J]. *Zhongnan Pharmacy (YongYao and Kang)*, 2017(06):7-13.
- [9] Huakang He, Research progress on chemical constituents and pharmacological effects of *Pinellia ternata* [J]. *Collection of Contemporary Medicine*, 2020, 18(07):18-20.
- [10] Lan Zhang, Honglei Li. Research progress of Gualou Xiebai Banxia decoction in the treatment of chest carcinoma [J]. *China Emergency Medicine of Traditional Chinese Medicine*, 2019, 28(09):1689-1692.
- [11] Xiaoli Yan. Study on the clinical effect of modified Gualou Xiebai Banxia decoction on the high-risk population of coronary heart disease (phlegm dampness and blood stasis syndrome) [J]. *Changchun University of Traditional Chinese Medicine*, 2023.
- [12] Nan Cai, Jing Feng. Relationship between plasma D-dimer level and coronary thrombus burden in elderly patients with acute ST-segment elevation myocardial infarction [J]. *Journal of Cardio-Cerebrovascular Disease of Integrated Traditional Chinese and Western Medicine*, 2023, 21(22):4188-4193.
- [13] Jing Zhou, Yan Zhang, Qian Zhang. Protective effect of Gualou Xiebai Banxia decoction on myocardial infarction in rats [J]. *Liaoning Journal of Traditional Chinese Medicine*, 2016, 43(02):410-412+448.
- [14] Xueran Zhang. Effect of Gualou Xiebai Banxia decoction combined with conventional western medicine on patients with acute myocardial infarction [J]. *China Minkang Med*, 2023, 35(11):111-113.
- [15] Chunxiao Ju, Yao Zhang, Xiaolin Liu. Methodological quality assessment of guidelines and consensus on the prevention and treatment of chronic heart failure [J]. *Chinese Journal of Evidence-based Medicine*, 2021, 21(09):1091-

1097.

[16] Hui Zhang. *Clinical observation of Zhenwu decoction combined with Gualou Xiebai Banxia decoction in the treatment of generalized chronic heart failure with Yang deficiency and water* [J]. *Modern Distance Education of Chinese traditional Medicine*, 2023, 21(16):45-47.

[17] Yan Xiong. *Effect of compound Danshen dripping pills on angina pectoris and cardiac function in patients with unstable angina pectoris* [J]. *Forum of Primary Medical Science*, 2023, 27(32):124-126.

[18] Fubao Deng, Junyan Yin, Wanli Gu. *Effect of Gualou Xiebai Banxia decoction on unstable angina pectoris* [J]. *Chinese Health Standard Management*, 2023, 14(09):137-140.

[19] Wei Lu, Wuwang Fang. *Meta-analysis of clinical efficacy of Gualou Xiebai decoction in the treatment of unstable angina pectoris* [J]. *Clinical Research of Chinese Medicine*, 2023, 15(05):112-116.

[20] Yong Li. *Comparison of clinical effect of ticagrelor and clopidogrel in the treatment of coronary heart disease with myocardial ischemia* [J]. *China Practical Medicine*, 2012, 17(04):143-145.

[21] Jianmin Zhang, Xiuming Jin, Shijun Wang et al. *Experimental study on treatment of acute myocardial ischemia with Gualou Xiebai Banxia Decoction* [J]. *Chinese General Medicine*, 2004(08):544-545. (in Chinese)

[22] Ru Jin, Yuguang Wang, Chunmiao Xue et al. *Consensus report on prescription review of proprietary Chinese medicines in primary care in Beijing (2018 edition)* [J]. *Chinese Journal of Hospital Pharmacy*, 2018, 38(18):1877-1887+1892.

[23] Baohua Zeng, Ting Ouyang. *Clinical observation of Gualou Xiebai Banxia decoction in the treatment of coronary heart disease* [J]. *Guangming Traditional Chinese Medicine*, 2022, 37(08):1355-1357.

[24] Zhengqiang Jiang. *Effect of traditional Chinese medicine Guawei-Xiebai Banxia decoction on inhibiting inflammatory response in patients with angina pectoris of coronary atherosclerotic heart disease* [J]. *Heilongjiang Traditional Chinese Medicine*, 2021, 50(06):149-150.

[25] Yushun Kang. *Clinical observation of Gualou Xiebai Banxia decoction combined with nitroglycerin in the treatment of unstable angina pectoris with congestion of phlegm* [J]. *Modern Distance Education of Chinese traditional Medicine*, 2021, 19(17):95-97.

[26] Hua Qian. *Curative effect of Gualou Xiebai Banxia decoction combined with Danshen decoction in the treatment of coronary heart disease and dyslipidemia* [J]. *Journal of Rational Drug Use in Clinic*, 2019, 12(34):12-13.