

Research Progress of Chinese Medicine in the Treatment of Cardiac Arrhythmia

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Abstract: *With the increasing pressure of modern work and life, the irregularity of people's diet and rest has led to a younger incidence of arrhythmia. Although western drugs have obvious transient effects on the treatment of arrhythmias, long-term use of western drugs may produce a series of adverse effects, especially for patients with weak constitution. Therefore, most patients prefer Chinese medicine, which has fewer adverse reactions, is more effective and can regulate the functions of the whole system. In recent years, TCM has achieved remarkable results in the treatment of cardiac arrhythmias through accurate TCM diagnosis and treatment. This article focuses on the progress of TCM in the treatment of cardiac arrhythmias, with the aim of providing a reference for subsequent studies.*

Keywords: Cardiac arrhythmia, Chinese medicine treatment, Research progress.

1. Preface to Chinese Medicine for Arrhythmias

Arrhythmia refers to abnormalities in the number, rhythm, location of generation, rate of transmission, and order of agitation of cardiac impulses. It can be divided into two categories according to the mechanism of generation: impulse generation disorder and impulse transmission disorder. According to the speed of the heart rate at the time of generation, it can be categorized into tachyarrhythmia and bradyarrhythmia. Globally, there are about 3.7 million sudden arrests per year, a large percentage of which are caused by severe arrhythmias [1]. According to the epidemiologic survey of sudden cardiac death in China, more than 80% of sudden cardiac deaths are caused by malignant arrhythmias every year [2]. In recent years, there have been many studies showing that traditional Chinese medicine, self-proposed formulas and modern proprietary Chinese medicines have great intervention effects on patients with severe arrhythmias. The author analyzed the studies in recent years to make the following comb.

2. History of Arrhythmia

Although there is no specific name for arrhythmia in Chinese medicine, according to its clinical symptoms in Chinese medicine, we can categorize it under the category of "palpitation". There are many ancient records about the name of "palpitation". At the beginning, although "Nei Jing" did not discuss the names of palpitation and palpitation, it did describe the symptoms of palpitation, such as "heart valgus" and "heart tanya", etc.; "Golden Chamber Essentials" proposed the name of palpitation for the first time; moreover, the clinical symptoms of palpitation can be categorized as "palpitation" in the ancient times. The name "palpitation" was first mentioned in the "Essentials of the Golden Chamber"; in addition, in the "Essentials of the Golden Chamber - Palpitation, Epistaxis, Epistaxis and Hematemesis, Chest Fullness and Blood Stasis Disease", it was pointed out that: "The pulse at the inches of the mouth is moving and weak, and when it moves, it is alarming, and when it is weak, it is palpitation". In the Treatise on Typhoid Fever, there is an

account of "palpitation of the heart". After that, in the Tang Dynasty, Sun Simiao wrote the "Preparing for the Emergency Thousand Golden Essentials Formula", which put forward the symptoms of "heart agitation" [3] and "agitation palpitation" [3], which is about the same as "palpitation". In the Song Dynasty, Yan Yunhe first proposed the name of "palpitation" in Jisheng Fang. Later, Chen Yan began to categorize palpitations into palpitations and agitated palpitations in his "Three Causes and One Disease Certificate Formulas" [4], which is still in use today.

2.1 The Etiology of Palpitations

For the etiology of palpitations, various schools of thought have put forward their own views. For example: "Suwen - paralysis on the chapter" said: "wind, cold and damp three gas mixed to, combined with the paralysis also Heart paralysis, the pulse can not be blocked, annoyed by the heart under the drum" [5]. And "Huang Di Nei Jing" that palpitation is due to compound external evil, Zong Qi leakage, heart veins are not accessible, sudden panic and other factors, which is generally consistent with the "Su Wen - Ping Ren Weather Theory" written: "left breast down, its movement should be clothes, Zong Qi leakage also". In the original text of the Treatise on Typhoid Fever, it reads, "If one has a stroke in the Shaoyang, the ears are deaf, the eyes are red, and the chest is full and irritated, one must not vomit it down, for vomiting it down will cause one to palpitate and be frightened". To the Song Dynasty, "re-series Yan's Jisheng Fang - palpitations, palpitations, fear and forgetfulness" mentioned "palpitations, the heart is weak and timid due to"; "fear and anxiety, the heart and blood is not enough" [6]. During the Jin-Yuan period, Liu Wansu, who advocated the cold school, put forward the viewpoint of "all six qi are from fire", and believed that internal heat is the main etiology of palpitation [7]. In addition, Zhu Zhenheng, a representative of the nourishing yin school of medicine, held the view that palpitation was "blamed on deficiency and phlegm". As for the Ming and Qing Dynasties, as an important period of the development of Chinese medicine, Zhang Jiebin put forward his own insights on the basis of Huang Di Nei Jing (Yellow Emperor's Classic of Internal Medicine), and he believed that yin deficiency is in the lower part of the body, yang floats in

the upper part of the body, and that deficiency of yin and labor damage are the cause of palpitation. Wang Qingren of the Qing Dynasty indicated in his "Reform and Error in Medical Forests" that internal obstruction of blood stasis was the main etiology and mechanism of the disease.

3. Herbal Monomers for Palpitations

The vast majority of Chinese herbs themselves have many significant pharmacological activity of single components, so they have a unique advantage in regulating arrhythmia. In Chinese medicine, most of the herbs are used to replenish the deficiency and warm the yang, invigorate the qi and blood, and dissolve the phlegm and clear the channels. In recent years, many scholars have found that the regulatory mechanism of Chinese medicine in treating arrhythmia is mainly to regulate the multiple ion channels of cardiomyocytes, such as sodium, potassium and calcium channels, to alleviate the overloading of cardiomyocytes, so as to achieve the effect of maintaining the stability of cardiomyocytes and to improve arrhythmia.

Panax ginseng has the efficacy of dispersing blood stasis, stopping bleeding, reducing swelling and fixing pain. Panax ginseng total saponin belongs to the most important active substance components of the traditional Chinese herbal medicine Panax ginseng, which has anti-infective, oxidation and apoptosis inhibiting effects [8]. Xiao Yuxue et al. [9] found that Panax ginseng saponins can reduce myocardial injury markers and serum levels of inflammatory factors, reduce pathological injury, and then regulate the function of the vascular endothelium by modulating the protein Cx43, protein ZO1, and the protein connection of Occludin, thus protecting the damaged myocardium. At present, it is widely used in the treatment of cardiovascular and cerebrovascular diseases [10].

Glycyrrhiza glabra has the effect of tonifying the heart and spleen, restoring the pulse and tranquilizing the heart. As one of the most widely used herbs in traditional Chinese medicine (TCM), licorice sweeteners and glycyrrhizic acid, the main components of licorice, are effective in intervening in cardiovascular and cerebrovascular diseases. Liu Dongsheng et al [11] found that glycyrrhizin could protect hypoxia-reoxygenated cardiomyocytes by inhibiting the increased expression of Inc-SNHG5. Jin Min et al [12] showed that glycyrrhizic acid could protect myocardium from ischemia-reperfusion injury, reduce myocardial cell membrane damage, and regulate energy metabolism to achieve the purpose of protecting cardiomyocytes.

Danshen has the effects of promoting menstruation and relieving pain, tranquilizing the mind, activating blood circulation and removing blood stasis. Tanshinone, as one of the most pharmacologically active components in *Salvia miltiorrhiza*, not only has a pharmacological effect that can play an antioxidant, but also can delay apoptosis. It is commonly used clinically in the treatment of cardiovascular, hypertension, hyperlipidemia and other diseases [13]. Xu Mengting et al [14] found that tanshinone reduced the production of inflammatory factors by converting the pro-inflammatory M1 produced by macrophages in the process of catabolism to anti-inflammatory M2, which in turn

inhibited the activation of the NF- κ B pathway, thus slowing down the apoptosis of cardiomyocytes.

Ginseng has the efficacy of restoring the pulse and fixing the hair, strengthening the spleen and lungs, tonifying the vital energy, generating fluids and nourishing the blood, and calming the mind and benefiting the intellect. The most important pharmacological active ingredient of ginseng is ginsenoside [15]. Cao Yuying et al. [16] found that ginseng is often used in combination with other single drugs in arrhythmia intervention, and that ginsenoside Re and ginsenoside Rg1 regulate calcium channels and change their electrophysiological activity to inhibit arrhythmia during the therapeutic process. Some scholars have also found that adequate doses of ginsenoside Re can effectively reduce ischemia/reperfusion injury of the heart, and play a better protective effect on cardiac function and ischemic myocardium through experimental research and monitoring of hemodynamic parameters [17].

4. Compound Prescription of Chinese Medicine for Palpitations

4.1 Chinese Herbal Scriptures for Palpitations

Roasted licorice soup combined with pulse-sustaining drink can effectively improve myocardial blood flow, regulate myocardial metabolism, reduce myocardial oxygen consumption, protect myocardial cells, regulate cardiac microcirculation and control blood pressure, alleviate the symptoms of qi and yin deficiency-type cardiac arrhythmia [18], and the heart rate is stable and the incidence of adverse effects is low after the use of the drug [19].

The addition of ephedra, epimedium, and fine-octopus soup can improve the blood supply and oxygenation of the heart by diastolizing capillaries, controlling platelet coagulation, improving cardiac contractility, and strengthening the heart. Scholar Wei Aizhen [20] believes that, with ephedra, epimedium and fine pith soup as a representative formula plus reduction of yin and yang deficiency type arrhythmia, can reduce serum Annexin II, hs-CRP content, and control the local inflammatory response; elevate PON1 level to improve lipid metabolism, protect myocardial blood supply and oxygenation, enhance the significant therapeutic effect. Zhang Yuyun et al. [21] found that combining Ephedra, Rhubarb, Radix et Rhizoma Ginseng and Hypericum Soup on the basis of shenmai injection for the treatment of bradyarrhythmia of Yang deficiency and blood stasis type can significantly increase the heart rate, reduce the blood and plasma viscosity as well as the plasma fibrinogen content, which in turn improves the blood rheology parameters and effectively alleviates the symptoms of traditional Chinese medicine.

Huanglian wen gallbladder soup plus reduction can not only inhibit refractory arrhythmia by regulating the flow of calcium ions in cardiomyocytes [22], but also has multi-targets and multi-pathway characteristics for the treatment of tachyarrhythmia [23]. Experimental study found that the combination of Huanglian Wengdian Tang plus reduction on the basis of metoprolol succinate extended-release tablets for the treatment of tachyarrhythmia

with phlegm-fire disturbing the heart syndrome is superior to the use of Western medicine alone, no matter in the results of efficacy, Chinese medicine symptoms or electrocardiogram indexes [24] [25].

In a study by Li et al [26], Ling Gui Jiu Gan Tang plus subtractions found that Ling Gui Jiu Gan Tang was able to treat chronic arrhythmia, probably due to accelerated activation of cellular Nrf2 signaling pathway and enhanced antioxidant enzymes, thus preventing cardiomyocyte apoptosis. Wang Jianxia [27] found that in the treatment of bradyarrhythmia, the combination of Ling Gui Jiu Gan Tang and Sheng Vegetable Drink Plus and Minus formula on the basis of oral atropine could increase the heart rate more safely and effectively than oral Xin Bao Wan.

Gui Zhi Gan Cao Long Bone Oyster Soup Plus Reduction, Zhang Xiang Yu et al [28] found that Gui Zhi Gan Cao Long Bone Oyster Soup was superior to Western medicine alone, both in terms of clinical efficacy in the treatment of ventricular pre-systole and in terms of lowering the number of ventricular pre-systoles and the number of Chinese medicine syndrome points. Feng Hui et al. [29] showed that the use of danshen polyphenolates together with Gui Zhi Gan Cao Long Bone Oyster Soup in the treatment of coronary arrhythmia with cardiac blood stasis can achieve the best therapeutic effect by significantly improving the patient's blood flow status.

4.2 Self-prescribed Remedies for Palpitations

Radix Panax Quinquefolii 10g, Radix Piperitiae 10g, Pickereliae 10g. Chen Jinfeng et al [31], in a study on the treatment of cardiac arrhythmia with deficiency of qi and yin combined with phlegm and blood stasis, found that in terms of Chinese medicine evidence, therapeutic efficacy, electrocardiographic indexes, quality of life, and safety, adding Lei's Nourishing the Heart and Activating the Blood Soup to the conventional treatment had a significantly greater effect than oral stabilizing heart granules.

The formula of the self-designed formula for calming the pulse and calming palpitations consists of 30g of Radix Rehmanniae Praeparata, 30g of Radix et Rhizoma Ginseng, 30g of Salviae Miltiorrhizae, 30g of Ganoderma Pinnatifida, 30g of Jujubae Radix, 30g of Astragalus Membranaceus, 15g of XuanShenGen, 15g of Maitake, 15g of GuiZhi, 10g of Fructus schisandrae chinensis, 10g of Radix Rehmanniae, 10g of Radix Rehmanniae, 10g of Radix et Rhizoma Ginseng, 10g of Fructus Ginseng, 10g of Radix et Rhizoma Ginseng, 10g of Fructus Ginseng, and 10g of Fructus Ginseng. Xu Dongping [32] studied the comparative treatment of tachyarrhythmia by taking oral Propafenone on the basis of western medical treatment and western medical treatment, and found that whether it is the number of days of hospitalization, efficacy of traditional Chinese medicine, biochemical indexes or electrocardiogram indexes, the efficacy of oral Propafenone is significantly better than that of oral Propafenone.

The formula of Stabilizing Heart and Restoring Pulse Soup with additional subtraction includes: 12g of roasted licorice, 10g of cinnamon branch, 10g of ginseng, 10g of raw earth, 10g of Colla Corii Asini (melted), 20g of Pueraria Mirifica,

10g of Rhizoma Atractylodis Macrocephalae, 10g of Succinum, 10g of Glycyrrhiza Glutinosa, 9g of Fructus Hederariae, and 10 jujubes. Cha Jinlei [33] found that by combining Stabilizing Heart and Repeating Pulse Soup with amiodarone to prevent and treat arrhythmia, the combination of Stabilizing Heart and Repeating Pulse Soup could effectively improve the clinical symptoms of arrhythmia by regulating and changing the patient's neurosomatological factors, thus obtaining the effect of both symptomatic and radical treatment.

5. Proprietary Medicines for the Treatment of Cardiac Arrhythmias

The main ingredients of Senxian Ascending Pulse Oral Liquid are red ginseng, epimedium, tonic acid, wolfberry, ephedra, fine pungent, danshen and leech, etc. It exerts the effects of warming the heart and kidneys, activating blood circulation and removing blood stasis. Li Lingkan et al [34] found that ginseng immortal ascending pulse could not only elevate heart rate and increase cerebral perfusion in mice, but also could reduce oxidative stress and protect cognitive function by activating cAMP/CREB/PGC-1 α pathway in brain tissue. Li Ao et al [35] found that Ginseng Xian Xingwei oral solution can effectively reduce the fibrosis of sinus node tissue in rats with pathological sinus node syndrome and increase the expression of various proteins in the calcium channel of sinus node cells, which in turn improves the heart rate.

Xinbao Pill mainly contains Yang Jinhua, deer antler, ginseng, epimedium, cinnamon, bingshi, panax ginseng, musk and other ingredients; it has the efficacy of activating blood circulation, benefiting qi and helping yang, and warming the heart and kidney. Meta-analysis by Sun Yuanlong et al. [36] found that Xinbao Pills could significantly reduce the clinical symptoms of bradyarrhythmia, electrocardiographic parameters, and the average heart rate of 24h. Ying Yang et al. [37] found that Xinbao Pills inhibited the expression of beclin-1, a key regulatory protein of cellular autophagy mediated by myocardial ischemia/reperfusion injury, and thus delayed the apoptosis of cardiomyocytes.

The main ingredient of Ginseng Song Nourishing Heart Capsules is formed by adding and subtracting on the basis of Sheng Wei San; it has the effects of benefiting qi and nourishing yin, activating blood circulation to achieve stagnation, and tranquilizing the spirit to settle palpitations to prevent and control cardiac arrhythmia of qi and yin deficiency [38]. Some research data pointed out that the application of ginseng pine heart nourishing capsule alone to treat patients with slow-developing arrhythmia and insufficient time of premature beats may have some effect on improving the average human heart rate, the frequency of premature beats and the clinical response [39]. In addition, Ginsong Nourishing Heart Capsules in combination with beta-blockers are clinically most effective in improving ventricular premature beats and relieving symptoms [40].

Stabilizing heart granules are based on the baked licorice soup, with the addition of Codonopsis pilosulae, Rhizoma Polygonati Odorati, Panax ginseng, Succinum sativum, and Ganson to exert the effect of benefiting qi and nourishing yin, activating blood circulation to eliminate blood stasis, and

calming the heart and tranquilizing the spirit and restoring the pulse [41]. Wei Ruili et al [42], through the comprehensive clinical evaluation of the safety and efficacy of Stabilized Heart Granules in the treatment of arrhythmia with deficiency of qi and yin, found that Stabilized Heart Granules belonged to Class A and could be converted into basic clinical medication.

Nourishing heart palpitation granules are mainly composed of cinnamon sticks, roasted licorice, keel bone, oyster, danshen, guayule, maitake, calamus and other herbal ingredients, which are mainly aimed at patients with tachyarrhythmia with deficiency of both qi and yin. It can also effectively reduce the clinical discomfort of patients by reducing the number of left ventricles in patients with swift arrhythmias, which in turn improves multiple indices such as electrocardiogram and left ventricular discharge fraction, thus improving the quality of life of patients [43]. The experiments of Chen Guo et al [44] also showed that Nourishing Heart Palpitation Pill for patients with chronic arrhythmia could improve their clinical outcomes by improving LEVF, reducing LVEDD, and thus effectively improving mental quality.

6. Summary and Prospects

Today's faster pace of life and changes in people's lifestyles have led to an increase in the prevalence of arrhythmic diseases. Cardiovascular disease as a long-term "battle", has a long history of traditional Chinese medicine for the treatment of arrhythmia is particularly important. Not only can it regulate the body's qi, blood, yin and yang to achieve both the symptoms and the root cause of the disease, but it also has fewer adverse effects, is less costly and safer. By combining their life's work with their own clinical experience, major medical practitioners have developed many proprietary Chinese medicines, which are not only effective, but also bring a lot of convenience to patients. Compared with Western medicine, it shows its unique development prospect. Of course, there are still many places that need to be improved. For example: there are many western clinicians who can not accurately diagnose and classify the situation of the use of pCms, so it is easy to cause the abuse of pCms, seeking the treatment of arrhythmia objectivity and standardization of clinical judgment guidelines is still a problem that we need to continue to break through; Secondly, the complexity of the Chinese medicine compounding is more complex, and its specific therapeutic mechanism is not enough to improve. Therefore, we need to continue to strengthen the research on animal experiments of Chinese medicine, to dig out more sufficient and effective evidence to show the thousands of years of clinical experience of Chinese medicine in China, and to better promote Chinese medicine to the world.

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