

MINI REVIEW



The role of traditional herbal medicine in the management of cardiovascular diseases: A comprehensive review

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ABSTRACT

Herbal medicines (HMs) have a long history in prophylaxis and dealing with cardiovascular diseases (CVDs). The use is increasing, with many patients combining HMs with given cardiovascular medications. Alarming, 70% of patients do not inform their cardiologists about their HM use, and 90% of physicians usually do not ask about it. Some scientific evidence from well-build clinical trials supports the effectiveness and security of HMs, and they do not lessen morbidity and mortality, thus not being recommended in clinical guidelines for CVD treatment. There is uncertainty regarding the identification, active components, and mechanisms of action of herbal medicines, made more complicated by issues of standardization and quality control, including contamination and adulteration. The common assumption that herbal medicines (HMs) are always safe is inaccurate; certain HMs may lead to significant adverse effects and interactions, especially when combined with cardiovascular drugs that have a limited range of effectiveness, like antiarrhythmics, antithrombotics, and digoxin. Cardiologists need to deepen their knowledge of herbal medicines to offer the best guidance and avoid negative side effects and drug interactions. The proposed mechanisms of action, potential clinical applications, and safety of frequently utilized herbal medicines (HMs) highlight the important role of cardiologists and physicians in protecting consumers while confronting the primary obstacles and deficiencies in research on the effectiveness of HMs for managing heart disease.

KEYWORDS

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Introduction

Herbal remedies have been utilized as traditional medicines for millennia in Eastern nations. Presently, nearly all major cities in China are home to large traditional medicine hospitals where various herbal treatments are dispensed to thousands of patients each day [1]. Remarkably, herbal remedies have slowly begun to penetrate Western medical markets as key complementary and alternative treatments over the last few decades. In fact, many recognized drug substances can be traced back to herbs, such as aspirin, digoxin, atropine, reserpine [2].

Various herbal remedies and their constituents, including ginseng, motherwort, garlic, red yeast rice, Danshen, Ginkgo biloba, tanshinone, and ginsenoside, have been employed in both clinical practice and experimental research to combat cardiovascular diseases (CVDs) [3]. These herbal remedies contain similar bioactive compounds, such as flavones, triterpenic acids, and phenolic carboxylic acids, which have exhibited beneficial effects against CVDs [4]. The theories regarding the treatment of diseases with herbal remedies are complex and varied. Additionally, there are differing opinions, particularly between Western and Eastern medical traditions, concerning the medicinal applications of herbs in clinical settings. Recent advancements have been achieved in understanding the pharmacological effects and the underlying systemic or molecular mechanisms of herbal medicines through modern evaluation techniques [5]. Drawing from clinical and basic scientific literature, this article emphasizes

the impacts and potential mechanisms of certain key herbal remedies in treating CVDs.

The rise of patent medicines in the early 1900s resulted in a decrease in the use of herbal medicine, as scientists and doctors began endorsing new synthetic drugs for their perceived superior efficacy and dependability. Around 3% of adults in the United States who speak English have stated they have used herbal remedies within the last year. This number is probably much higher among Americans who do not speak English.

Herbs and Plants as Drug

The study of traditional healing practices is the main focus of traditional medicine and ethnomedicine within various cultural factions, trace their origins back to the dawn of human history. Traditionally, natural resources were the primary source of medicines. In the past, substances derived from plants, typically referred to as herbs, along with plant extracts, constituted the foundation of the earliest pharmaceuticals utilized in various cultural medicinal practices. Plants and herbs have always been an important source of medicine, whether used in traditional remedies or as individual active components. The importance of nature in finding new essential pharmaceuticals for treating illnesses is evident. Famous medications originating from herbs and plants include aspirin from *Salix alba L.*, digoxin from *Digitalis purpurea*, ephedrine from *Ephedra sinica*, lovastatin from *Monascus purpureus L.*, taxol from *Taxus brevifolia*, and reserpine from *Rauvolfia*

serpentina, among others [6]. Surprisingly, reserpine remains a successful remedy for hypertension [7]. Moreover, the discovery of antimalarial drugs like quinine extracted from the bark of Cinchona plants and artemisinin obtained from *Artemisia annua* L. demonstrates how traditional medicine can aid in finding new medications [7].

Cerebral and Peripheral Vascular Disease

Ginkgo biloba, also called maidenhair tree, has been around for more than 200 million years and was saved from extinction thanks to human efforts, thriving in temple gardens in the Far East while vanishing in the West until it was reintroduced to Europe in 1730. Even though the roots and seeds have been used in traditional Chinese medicine for a long time, the tree gained recognition for its medicinal benefits in the Western world in the 20th century with the introduction of a concentrated leaf extract originated in the 1960s. This portion, known as Ginkgo biloba extract (GBE), consists of Flavonoids that act by reducing capillary permeability and fragility as well as working as antioxidants [8,9]. It also includes terpenes (ginkgolides) that inhibit platelet-activating factors, lower vascular resistance, and improve blood flow without significantly affecting blood pressure. GBE is primarily used to treat cerebral insufficiency and related symptoms such as vertigo, tinnitus, memory issues, and mood disturbances, and is also useful for peripheral vascular diseases like diabetic retinopathy and intermittent claudication [10]. Studies, including a randomized, placebo-controlled, double-blind trial, have shown that the standardized extract EGb 761 decreases ischemic areas and may benefit those with intermittent claudication and peripheral artery disease [11]. Additionally, EGb 761's anti-free radical action shows promise in protecting against myocardial ischemia-reperfusion damage, as evidenced by studies on animal models and patients undergoing coronary bypass surgery. Further studies are required to validate its effectiveness as an adjuvant in mitigating tissue injury and metabolic changes after different coronary interventions.

Atherosclerosis

Garlic (*Allium sativum*) has been highly regarded for its healing qualities as well as its role in cooking for many years. Recent scientific studies have concentrated on garlic's ability to prevent atherosclerosis and its positive effects on cardiovascular health [12]. Studies have demonstrated that garlic can lower blood pressure, inhibit platelet aggregation, enhance fibrinolytic activity, reduce serum cholesterol and triglyceride levels, and protect the aorta's elastic nature. Consumption of large quantities of fresh garlic (0.25 to 1.0 g/kg) has been shown to yield these benefits. A double-blind crossover trial involving men with high cholesterol showed that 7.2 g of aged garlic extract led to a notable decrease in total serum cholesterol and LDL cholesterol levels when compared to a placebo [13, 14]. Despite positive findings, some researchers hesitate to endorse garlic's routine use for cardiovascular disease due to methodological shortcomings in many studies, such as small sample sizes, lack of statistical power, and inadequate randomization methods. One study discovered that garlic did not influence lipid levels, while another indicated it did not affect cholesterol absorption or metabolism. The effect of

garlic's influence on atherosclerosis is still debated, emphasizing the necessity for larger and more meticulously designed trials to properly evaluate its cardiovascular advantages [15].

Angina Pectoris

Crataegus hawthorn includes various classes like *Crataegus oxyacantha*, *Crataegus monogyna*, and *Crataegus pinnatifida* [16]. It is well-known in contemporary herbal literature for its benefits as a cardiovascular tonic, especially for angina. The leaves, blossoms, and fruit hold active compounds like oligomeric procyanins, flavonoids, and catechins, which provide antioxidant effects and prevent the formation of thromboxane [17]. *Crataegus* extract may prevent atherosclerosis by lowering cholesterol levels in low-density and very low-density lipoproteins and increasing the breakdown of cholesterol in the liver into bile acids. It exhibits cardioprotective effects on ischemic-reperfused hearts and increases coronary blood flow. Clinical trials show *Crataegus* improves cardiac performance in heart failure patients, possibly by inhibiting 3', 5'-cyclic adenosine monophosphate phosphodiesterase, leading to increased coronary perfusion, mild hypotension, and positive inotropic and negative chronotropic actions [18]. Notably, *Crataegus* has fewer arrhythmogenic risks compared to other inotropic drugs and can enhance digitalis activity.

Panax notoginseng, often called pseudoginseng due to its resemblance to *Panax ginseng*, is used in traditional Chinese medicine for analgesia and hemostasis, and in treating angina and coronary artery disease [19]. It acts as a selective calcium ion antagonist, potentially affecting fibrinolytic parameters and inhibiting atherogenesis. Although promising, clinical trials are needed to confirm its cardiovascular benefits.

Salvia miltiorrhiza (dan-shen), a relative of sage, is used in Chinese medicine as a circulatory stimulant and sedative. It dilates coronary arteries, inhibits platelet aggregation, and protects myocardial mitochondrial membranes from ischemia-reperfusion injury due to its free radical-scavenging effects. Clinical trials are essential to evaluate its safety and efficacy, especially considering its interaction with warfarin, which can increase warfarin-related adverse effects [20].

Arrhythmia

In Chinese traditional medicine, arrhythmias are recognized through symptoms like fluttering sensations and an irregular heartbeat. Several Chinese herbal medicines are known for their antiarrhythmic effects, including xin bao, ci zhu wan, and bu xin dan, among others [21]. However, there have been some medical trials to evaluate their efficacy and safety. Xin bao is one herbal remedy that has undergone some examination. The proposed mechanism of action is thought to activate and enhance the excitability of the sinoatrial node. An observational study with 87 patients diagnosed with sick sinus syndrome involved administering xin bao orally two to three times daily for a duration of two months [22]. Significant improvement was observed in patients experiencing major symptoms of sick sinus syndrome, such as dizziness, palpitations, and chest pressure, with no serious adverse effects reported. This study suggests that xin bao may have potential in treating sick sinus syndrome.

Nevertheless, more scientific research is needed on xin bao and other antiarrhythmic Chinese herbs before they can be recommended for routine use in patients with sick sinus syndrome or other arrhythmias.

Conclusions

Considering the widespread use of herbal remedies in the United States, healthcare providers ought to regularly ask about these practices during patient interviews and keep up-to-date on the possible advantages and disadvantages of such treatments. Continuous investigation is crucial for comprehending the pharmacological properties of different cardioprotective herbal remedies and for advancing the development of therapeutically effective herbal medications. Legal surveillance of herbal medicines with low safety margins should be implemented to protect public health, especially concerning plants with known contrary cardiovascular reactions and medicine interactions. As new clinical trials provide more data on the safety and efficacy of any herbal medicines, research-backed information could eventually be made available to consumers and physicians, akin to the information provided for allopathic medicines.

Disclosure statement

The authors declare that there are no conflicts of interest that could affect the results or conclusions of this study.

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