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A Review On Cardiovascular Diseases And Uses Of Herbal Medications.

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ABSTRACT

Cardiovascular diseases are the principal cause of death worldwide. The potentially serious adverse effects of therapeutic drugs lead to growing awareness of the role of herbal medicine in the treatment of cardiovascular diseases. Herbal medicine has been widely used in many countries. This review will cover the plants with vascular, hypotensive, cardioprotective, antiarrhythmic, hypolipidemic, hemostatic, fibrinolytic and anticoagulant effects.

Keywords: Medicinal plants, phytochemicals, cardioprotective, antiarrhythmic, hypolipidemic, hemostatic, fibrinolytic, anticoagulant.

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INTRODUCTION

According to the World Health Organization, the burden of chronic diseases, including coronary heart disease (CHD), cancers, diabetes and obesity contributed 59% of the 56.5 million deaths reported worldwide in 2001. With CHD ranking number one as the main contributor to morbidity and mortality worldwide, there is a significant interest in identifying plants that have cardioprotectant and cardiotonic activity, as well as the phytochemicals responsible for these activities.

Cardiovascular diseases, mainly including atherosclerosis, hypertension, cardiac hypertrophy, myocardial infarction and heart failure, are the principal cause of death worldwide. The increasing number of patients around the world suffering from CVDs indicates the need for innovative strategies for more effective prevention and treatment.

Coronary Heart Disease

Coronary heart disease includes all diseases of the circulatory system including acute myocardial infarction, ischemic heart disease, valvular heart disease, peripheral vascular disease, arrhythmias and stroke. While the dietary association with CHD is clearly important, several genes and variants have been associated with increased CHD risk, including some encoding components for the renin angiotensin system, and mutations in the genes encoding the hepatic low-density lipoprotein LDL receptor protein, apolipoprotein E, lipoprotein lipase and interleukin-6 and leptin. Thus, future food and medicinal plant research should focus on the assessment of how phytochemical constituents interact or regulate the expression of these genes [3].

Atherosclerosis

Atherosclerosis, one of the primary causes of CVDs is a vascular disease that occurs at susceptible sites in major arteries. It is an inflammatory process and ultimately causes stenosis or thrombosis with potentially lethal distal ischemia. The main elements involved in the complex pathogenesis of atherosclerosis include hyperlipidemia, endothelial injury, LDL subendothelial retention and oxidation, monocyte migration and activation, VSMC migration and proliferation, foam cell formation, apoptosis and efferocytosis and unresolved inflammation. Among them, dyslipidemia is the primary independent risk factors, which is characterized by elevated level of total cholesterol (TC), triglyceride (TG), LDL-C and by lowered level of high-density lipoprotein cholesterol (HDL-C) in serum [1-3].

Oxidative Stress

Many data have demonstrated that ROS production by myocardial endothelial mitochondria contributes to heart disease and oxidative stress with in ventricular myocytes canal so be detrimental to the heart. Infact, much of the contractile dysfunction and adverse myocardial remodeling, which has been observed in a wide range of cardio myopathies, involves oxidative stress and Enos uncoupling leading to a decrease in NO. There are a series of targets at which herbal medicine act to improve myocardial endothelial function by attenuation of oxidative stress [5].

Cardiomyocytes

Alleviation of Cardiac Hypertrophy Pathological cardiac hypertrophy induced by increased sympathetic drive can subsequently lead to congestive heart failure, which represents the major cause of morbidity and mortality worldwide. Astragalus polysaccharide is an active compound extracted from Chinese herb Astragalus membraneaceus for “Qi-invigorating.”Inthe in vitro cardiac hypertrophic model induced by isoprenaline, Astragalus polysaccharide treatment inhibited significant increases in cell surface area, total protein content, protein synthesis as well as the expression of hypertrophic markers, including ANP and B-type natriuretic peptide. Inaddition, Astragalus polysaccharide pre treatment not only alleviated the augmentation of intracellular free calcium during cardiac hypertrophy but also up regulated expression of calcineurin, translocation of nuclear factor of activated Tcells, cytoplasmic into nucleus and activation of Calmodulin kinase II.

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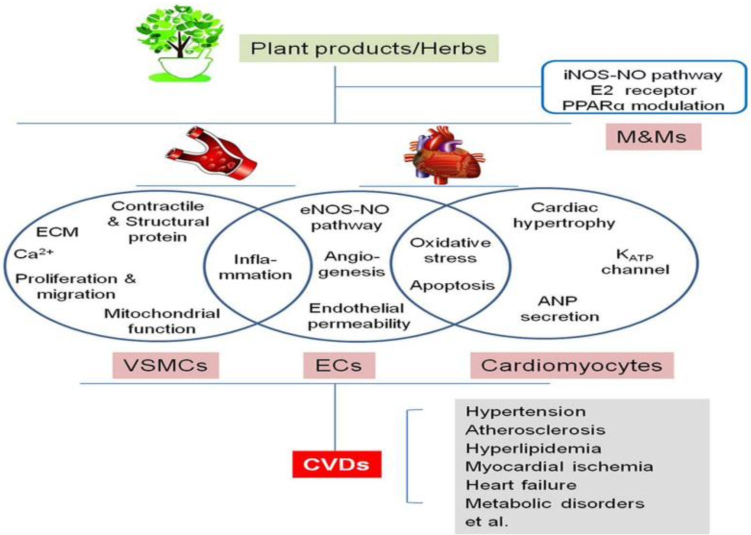
Treatment Of Cardiac Problems With Herbal Plant Parts

Chinese herbal formula SiniTang/decoction (*Aconitumcarmichaelii, Zingiber officinale, Glycyrrhiz auralensis* or *Cinnamomum cassia*) was reported to improve cardiac function (ejection fraction and fractional shortening) after myocardial infarction in rats.



Ginseng

Ginseng is an anciently cultivated plant (2000 years ago) partly due to its ritual use. Ginseng use in traditional medicine goes back to 20 centuries ago, but its use in Western medicine dates back to the early 20th century by two British physicians F. Porter Smith and G.A. Stuart who were exploring Chinese herbal remedies at the time Ginseng habitats include Asian countries such as Korea, China, Japan and Vietnam, and North American countries, mainly Canada and the United States. Korean red ginseng, Chinese ginseng (Panax notoginseng Burkill; F.H.Chen.), American ginseng (Panax quinquefolium L.) and Japanese ginseng (Panax japonicas C.A. Mey.) represent the most commonly used ginsengs[7].

Allium sativum

Garlic (*Allium sativum*, Liliaceae), also known as "the spice of life", was one of the earliest documented examples of a food plant also used for the prevention and treatment of disease. The plant is a perennial, erect bulbous herb, with the bulb, giving rise to a number of narrow, keeled, grass-like leaves above ground. The medical history of garlic dates back at least 4000 years, where its medical uses were described in the ancient Chinese, Indian and Sumerian literature. Discorides, a Roman physician, recommended garlic to clean the arteries, and Hippocrates (460-370 BC), the father of modern medicine, was known to prescribe garlic for a wide variety of ailments. Garlic has been used as a food and medicine for thousands of years, and more recently has been the focus of numerous clinical studies, primarily for its cardiovascular benefits.

Garlic contains a number of disulfide and trisulfide organosulfur compounds that appear to be the active constituents. More than 35 randomized trials have been reported in which the effects of garlic on cardiovascular endpoints have been examined. Overall, there is evidence from randomized controlled trials (RCT) in adults that use of garlic preparations can lead to a small but statistically significant reduction in total cholesterol levels as compared with controls.

Allium cepa

Raw onions and the essential oil both are increased fibrinolysis in rabbits and humans. An increase in coagulation time was also observed in rabbits. *Allium cepa* inhibited platelet aggregation *in vitro* and *in vivo*. An aqueous extract of *Allium cepa* inhibited diphosphate, epinephrine, arachidonic acid, adenosine and collagen induced platelet aggregation *in vitro*. Essential oil, a butanol and chloroform extract inhibited platelet aggregation in rabbits. Chloroform, ethanol, butanol extract and the essential oil 10–60µg/ml inhibited aggregation of human platelets *in vitro* by decreasing thromboxane synthesis [1].

Brassica rapa

Crude extract and fractions of *Brassica rapa* was screened against human platelet aggregation induced by two different aggregating agents and further delineated their underlying signal transduction pathways. Furthermore, *Brassica rapa* was screened for the presence of calcium channel blocking potential. The results showed that *Brassica rapa* blocked calcium channel opening as indicated by its effects on KCl-induced contraction in guinea pig ileum and this activity was distributed into various fraction of *Brassica rapa* except ethyl acetate fraction which did not show any significant calcium channel blocking activity [1].

Calotropis procera

The proteins derived from the latex (LP) of Calotropis procera were evaluated for their efficacy in maintaining coagulation homeostasis in sepsis. Intraperitoneal injection of LP markedly reduced the procoagulation and thrombocytopenia observed in mice infected with Salmonella; while in normal mice, LP produced a procoagulant effect. In order to understand its mechanism of action, the LP was subjected to ion-exchange chromatography, and the three subfractions (LPPI, LPPII, and LPPIII) thus obtained were tested for their proteolytic effect and thrombin- and plasmin-like activities *in vitro*. Of the three subfractions tested, LPPII and LPPIII exhibited proteolytic effect on azocasein and exhibited procoagulant effect on human plasma in a concentration-dependent manner. Like trypsin and plasmin, these subfractions produced both fibrinogeno -lytic and fibrinolytic effects that were mediated through the hydrolysis of the Aα, Bβ, and γ chains of fibrinogen and α-polymer and γ-dimer of fibrin clot, respectively [7].

Citrus limon

In vitro / *in vivo* study was designed to determine the effect of *Citrus limon* on blood parameters, coagulation and anticoagulation factors. *In vitro* tests revealed highly significant increase in thrombin time and activated partial thromboplastin time by *Citrus limon*, whereas fibrinogen concentration was significantly reduced in comparison to control, however prothrombin time was not affected significantly. *In vivo* testing of *Citrus limon* was carried out at three different doses (0.2, 0.4 and 0.6ml/kg) in healthy rabbits. Significant changes were observed in hematological parameters such as erythrocytes, hemoglobin and mean corpuscular hemoglobin concentration. Bleeding time and thrombin time were significantly prolonged and there was increase in protein C and thrombin antithrombin complex levels. These results may be due to inactivation of thrombin because it significantly decreased fibrinogen concentration and inhibited platelet aggregation [1, 6].

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