

Cardiac Risk Factors Extend Beyond Cholesterol

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Cholesterol has always taken center stage in discussions about heart health. Cholesterol, specifically high levels of low-density lipoprotein (LDL) cholesterol, is clearly a risk factor for cardiovascular disease. Yet, many individuals who have high cholesterol levels never have a heart attack. Similarly, people who have low cholesterol levels can die from sudden cardiac death. Furthermore, lipid peroxidation—the process by which lipids in the body are exposed to free radicals—more than cholesterol levels per se are associated with heart attacks.¹

The reason for this seeming contradiction is that other factors besides cholesterol influence heart health. High levels of homocysteine and fibrinogen are as harmful as high LDL cholesterol to cardiovascular health.

Another important but often overlooked factor are cardiac arrhythmias, which is the particular heart attack risk factor that I will address in this article. Arrhythmias are disorders of the regular rhythmic beating of the heart. Approximately 2.2 million Americans are living with a common type of heart rhythm disorder known as atrial fibrillation.²

Arrhythmias can occur in a healthy heart and be of minimal consequence. However, often they are a marker of a serious problem with the heart and lead to heart disease, stroke or sudden cardiac death. Symptoms of cardiac arrhythmias include palpitations, syncope (loss of consciousness), spells of lightheadedness, chest pain or symptoms of congestive heart failure.

The heart has an internal electrical system that controls the rhythm of the heartbeat. Problems with this electrical system can cause arrhythmias. There are many types of arrhythmia. During an arrhythmia, the heart can beat too fast, too slow or it can stop beating. Sudden cardiac arrest occurs when the heart develops an arrhythmia that causes it to stop beating.³

A number of natural agents have been shown to support normal heart rhythm and improve cardiac function. Some effects of these natural agents include increasing strength of heart contractions, increasing myocardium (heart) tissue oxygenation and scavenging free radicals. The synergy of these natural substances provide support for a healthy cardiac rhythm.

Magnesium

Magnesium is the second-most abundant element within the human cell. Over 300 magnesium-dependent enzymes have been identified to date, underscoring magnesium's vital role in metabolism.⁴ ATP (energy) production, protein synthesis, nerve function and DNA replication are all driven by magnesium-dependent enzymes. As nature's "calcium channel blocker," magnesium helps control the excitability of nerves and is essential for relaxation of the heart muscle between beats.⁴ Dietary magnesium deficiency results in altered heart rhythm, and several studies support the value of intravenous magnesium in preventing post-surgical atrial fibrillation.⁵⁻⁷

Magnesium is used in the conventional medical model intravenously to treat various types of arrhythmia including atrial tachycardia, atrial fibrillation, ventricular fibrillation and supraventricular tachycardia. Clinically preventing a low magnesium status within the body is an important cardiac

protective strategy. Since a mere one percent of magnesium is found within the serum, a regular blood test does not serve as an adequate measure of magnesium status and RBC (Red Blood Cell) magnesium is a much better measure of true body magnesium stores.⁸⁻¹²

An additional effect of magnesium is that it may reduce the symptoms of mitral valve prolapse in individuals with low magnesium levels.¹³

Taurine

Taurine is a conditionally essential amino acid found in large amounts in heart, platelets, brain and eyes.¹⁴

Though taurine is not an essential amino acid, it is critical to have sufficient levels therapeutically when there is a higher “conditional” utilization such as when there is increased cardiac demand. Taurine concentration increases in the left ventricle of patients with congestive heart failure, illustrating the increased conditional requirements.¹⁵

Supplementation with taurine alters intracellular calcium levels and enhances left ventricular function.¹⁶

Taurine modulates the activity of cyclic adenosine monophosphate (cAMP), which belongs to a class of substances known as “second messengers,” and is one of the most important cell-regulating compounds. Among its many roles, cAMP activates numerous enzymes involved in diverse cellular functions. Through its cAMP-modulating activity, taurine affects enzymes in heart muscle that contribute to contractility. Taurine also plays a role in calcium metabolism and may affect entry of calcium into heart muscle cells where it is essential in the generation and transmission of nerve impulses.¹⁷ Research shows that taurine may prevent arrhythmogenesis by limiting cardiac hypertrophy and calcium overload of the myocardium.¹⁸ Taurine also protects the heart against reperfusion-induced arrhythmias via its properties as a membrane stabilizer and as an oxygen free radical scavenger.¹⁹ Reperfusion injury refers to tissue damage caused when blood supply returns to the tissue after a period of oxygen deprivation (ischemia). The absence of oxygen and nutrients from blood creates a condition in which the restoration of circulation results in inflammation and oxidative damage through the induction of oxidative stress.

Arrhythmias characteristic of acute myocardial ischemia may be due to loss of intracellular taurine. Researchers found that intravenous administration of taurine prevented arrhythmias caused by digitalis. Taurine also inhibited the drop in potassium levels inside heart cells, which can cause electrical instability and arrhythmias.²⁰ Supplemental taurine has been shown to reduce the occurrence of myocardial infarction and to lower elevated blood pressure by reducing sympathetic tone.²¹

Berberine, Notoginseng and Sophora: Herbal Trio for Ventricular Regularity

Berberine

Berberine is a plant alkaloid found in such herbs as European barberry, goldenseal, goldthread, Oregon grape and phellodendron. Berberine has been shown to possess inotropic (increasing strength of heart contractions), and anti-arrhythmic properties. Evidence also suggests that berberine

administration can help prevent the onset of re-entrant ventricular tachyarrhythmias and sudden coronary death after ischemic damage to the heart.

The effects of berberine on individuals with ventricular tachyarrhythmias showed that 62 percent of patients had 50 percent or greater, and 38 percent of patients had 90 percent or greater, suppression of ventricular premature contractions.²² No severe side effects were observed from berberine therapy. In humans with refractory congestive heart failure, berberine produced several significant changes: a 48 percent decrease in systemic and a 41 percent decrease in pulmonary vascular resistance, along with a 28 percent decrease in right atrium and 32 percent decrease in left ventricular end-diastolic pressures.²³ A measurable increase in cardiac index (45 percent), stroke index (45 percent) and left ventricular ejection fraction (56 percent) also was observed.

There is preliminary evidence that berberine can lessen the frequency of premature ventricular contractions (PVCs) and decrease the mortality in patients with congestive heart failure from ischemia or dilated cardiomyopathy.²⁴

Panax Notoginseng

Also known as tienchi or pseudoginseng, this herb is a relative of the well-known Panax ginseng. It has a history of traditional use in China where it is highly regarded as a heart tonic. Notoginseng has been shown to enhance coronary blood flow and microcirculation in the heart muscle and promote healthy blood pressure.²⁵ Saponins found in notoginseng significantly improve arrhythmia induced by ischemia/reperfusion.²⁶ Notoginseng functions, in part, by optimizing the action potential of Purkinje fibers, which are responsible for the electrical signal of the heartbeat.²⁷ The saponin in notoginseng supports cardiac health by optimizing sinus node recovery time and prolonging ventricular effective refractoriness and repolarization.²⁷

Panax pseudoginseng is believed to dilate the coronary vessels, reduce vascular resistance, and improve the coronary collateral circulation. This could increase blood flow while reducing blood pressure. It would also reduce the heart metabolic rate and oxygen consumption. Evidence also suggests Panax pseudoginseng has an antiarrhythmic effect.²⁸

Animal studies have demonstrated that oral supplementation with Panax pseudoginseng can help reduce fibrinogen levels and decrease cholesterol and triglycerides.²⁹ Panax notoginseng also has been shown to possess protective antioxidant properties.³⁰

Sophora flavescens

Another Chinese herb with a rich history of use is Sophora, a member of the Leguminosae family, which includes beans and peas. Sophora has been traditionally used in such diverse conditions as asthma, bronchitis, bacterial and fungal infections, skin disorders and more.³¹ The compounds of interest in Sophora include oxymatrine and its principal metabolite, matrine.³²

Sophora extracts and oxymatrine have been shown to reduce the incidence and delay the onset of experimentally induced ventricular tachycardia.³³ Oxymatrine helps improve heart rate variability (HRV), by reducing both atrial and ventricular premature beats.³⁵ Oxymatrine functions by increasing

the heart's diastolic excitability threshold (DET), which improves the relaxation phase, and by lengthening the effective refractory period (ERP), which helps prevent premature contraction.³⁵

Conclusion

The average heart beats 72 times per minute and contracts 103,680 per day. The steady and regular contraction of the human heart from prior to one's birth and throughout life requires proper nutritional support. Taurine, magnesium and the botanicals discussed can play an important role in helping sustain healthy cardiac performance together with a physician-supervised heart health protocol. The addition of accessory nutrients that also fuel cardiac performance such as CoQ10 and L-carnitine are pivotal natural agents required by the heart.

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