

The Cardiovascular Disease Epidemic: A Primer on Natural Therapies

By Casey Adams, IHD, NP

Cardiovascular disease is serious business. CVD is the number one cause of death in the United States and the leading cause of worker disability. The World Health Organization estimates some 17 million people die worldwide each year from CVD, about one-third of all deaths. Stroke alone disables more than a million Americans per year. CVD kills people in their prime of life and causes more than half of all deaths among women. Though cardiovascular drugs are widely prescribed and prevention information has been widely available through efforts by groups like the American Heart Association, this disease continues to ravage our society. Chemical solutions are simply applied too late and complicated by side effects or interactions to be fully effective in thwarting this epidemic.

Alternative health professionals may have a better approach. Research on natural therapies for cardiovascular conditions has provided substantial evidence of effectiveness with added benefits of safety and long-term use. Natural therapies can thus be applied on a broader level, affecting the undiagnosed masses. The trained alternative practitioner is armed to provide patients with effective lifestyle choices and botanical therapies to thwart most CV issues before they become critical.

What is CVD?

Although the heart is the cardiovascular command center, cardiovascular health is directly related to the elasticity and strength of the blood vessel walls and the health of the blood, requiring effective liver function. CVD conditions typically include:

- coronary artery disease: diseased or weakened arteries that feed the heart
- hyperlipidemia/hypercholesterolemia: high levels of cholesterol, low- and very-low-density lipoprotein and/or triglycerides and/or low levels of high-density lipoproteins
- ischemic heart disease: restricted blood flow to the heart, causing angina or myocardial infarction
- hypertension: high blood pressure
- atherosclerosis: artery wall lesions that result in a thickening of lumen and restricted blood flow
- thrombosis/embolism: circulating aggregations that obstruct blood vessels
- stroke: obstruction in cerebral blood vessels
- cor pulmonale heart disease: hypertensive obstruction of lung-heart blood vessels

The most common heart disease is ischemia, with causes including elevated cholesterol, hypertension, and atherosclerosis. Current theory on atherosclerosis is that it's a narrowing of artery walls due to oxidative LDL and other free radicals which inflict damage upon the arteries, with an inflammatory response of plaque build-up, fibrin and thickened lumen.

Diagnosis and Treatment Goals

Diagnosing the risk of cardiovascular disease before a traumatic life-threatening event occurs is a high priority. Obvious signs are metabolic disorders such as obesity or diabetes, a sedentary lifestyle, and/or a diet high in saturated fats and/or fried foods. High blood pressure and fast or irregular heart rate, especially in persons over 40 years old should be considered CVD risk factors. Higher levels of total cholesterol, low-density and very low-density lipoprotein cholesterol and total triglycerides indicate high risk. Although research several years ago indicated that low cholesterol was a mortality risk factor among the elderly, these studies have not been replicated and have been refuted by subsequent studies.(1,2) Small LDL particle size is now associated with higher risk of atherosclerosis,(3) and a recent study of 1371 subjects has connected insulin resistance with small LDL particle size.(4) Additional diagnostic tools for CVD risk include homocysteine, fibrinogen and C-reactive protein levels.(5) Higher CRP levels indicate the possibility of inflammation relating to atherosclerosis. Higher fibrinogen levels can indicate the potential of clotting events, which can result in thrombosis. Higher homocysteine levels may indicate a problem with

transmethylation, the liver-regulated glutathione process of exchanging methyl groups to reduce oxidative stress. Methylation problems can be the result of a lack of bioavailable methyl groups such as B vitamins.

Most of these conditions can be linked to the lifestyle choices people make, although there are also genetic predispositions toward CVD. Some debate that dietary habits passed down through families can account for as much or greater responsibility than genetics.(6,7) Poor choices that predispose one to CVD include smoking, faulty dietary habits, a sedentary lifestyle, stress and alcohol consumption. The goal of preventive therapy is to reduce hypertension, moderate cholesterol levels, improve methylation and free-radical scavenging capability, prevent artery damage, lower the likelihood of platelet-aggregation, increase vital heart and lung capacity and increase metabolism.

Foods and Nutrient Therapies

Although the jury is still out on the long-term safety of low-carb diets, it has become clear that diets high in saturated fats increase CVD risk, as they reduce vasodilation and increase cholesterol levels. Foods known to be high in saturated fats include animal meats, eggs and butter.(1,2) Other dairy such as milk, cheese and yogurt, especially skim versions, contain less saturates, and supply various vascular benefits. A 2002 randomized double-blind placebo study of 51 healthy adults showed that conjugated linoleic acid from dairy showed significantly improved levels of VLDL-cholesterol and triacylglycerol-rich lipoproteins.(3) Coconut oil, historically considered a harmful saturated fat, actually contains medium chain fatty acids which have been shown in human studies to lower lipoprotein-A concentrations in the blood, improve fibrinolytic effects and increase HDL levels.(4) In recent years research on trans-fat consumption has concluded that oils which have undergone commercial refining, hydrogenation or partial-hydrogenation and foods fried in vegetable oils (such as chips and french fries) can contain high levels of trans fats. These trans-fats create oxidative damage to artery walls, increasing inflammation and plaque build-up.(5,6,7)

With regard to optimal fat consumption, recent studies have shown that long chain omega-3 fatty acids such as alpha linolenic acid (ALA), eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) work synergistically with gamma linoleic acid (GLA—an omega-6) to increase artery wall strength and lower cholesterol, triglyceride, LDL and VLDL levels. DHA and EPA can be converted in healthy humans by the consumption of ALA from such foods as flax and pumpkin seeds, while GLA is found in green leafy vegetables, spirulina, borage and primrose oils. Recent studies have shown that the optimal diet should contain about equal amounts of omega-3 and omega-6 oils, and that higher-proportion omega-6 diets have a higher CVD risk.(8) Conversion from ALA to DHA may be reduced in unhealthy adults, leading to the popularity of fish and fish oil-derived DHA. A newer alternative is DHA from golden micro-algae, which avoids the possibility of saturated fat, mercury or excess vitamin A (in cod liver oil) that fish oil may present, and its DHA easily converts to EPA in the body.(9,10) CV-healthy omega-6 oils include nuts, sesame and sunflower seeds and their unrefined oils, virgin olive oil and unrefined canola oil—which also has some omega-3. At the end of the day the optimal fat intake for CV health would be low saturates, low (or no) trans-fats, and equal amounts of omega-3 to omega-6 oils.(11)

Several other nutrients have notable effects upon heart and vascular health. CoQ10, found in most natural foods in small amounts and manufactured in healthy cells, has been shown to prevent oxidation of LDL, thus decreasing atherosclerosis potential. Supplemental Co-Q10 has been linked to improved heart muscle performance and improved pulmonary capacity, as well as lowered hypertension.(12) The amino acid L-Carnitine and pantothenic acid, a derivative of B5 are both known to improve heart function, being critical in fat and energy metabolism. They have both been linked to reducing angina, lowering triglycerides and increasing HDL.(13,14) Magnesium has also been linked to reductions of angina and coronary artery events by dilating arteries, improving oxygen delivery, inhibiting platelet aggregation and inhibiting arrhythmias.(15) Vitamins C and E have been shown to contain antioxidant properties providing artery-wall protection,(22) and B6 is known to help reduce blood pressure. Micro- and macrominerals such as calcium, potassium, boron and zinc are also known to strengthen and promote flexibility in artery walls and heart muscle while improving nerve function. All of these nutrients should be present in a healthy diet, but can also be supplemented to therapeutic levels.(23)

Several food extracts have come to light over the past few years that have shown notable CV benefits. Nattokinase, an extract from fermented natto soybeans, has shown strong fibrinolytic and proteolytic properties. This makes NK help break apart fibrin and thus delays clotting and platelet aggregation, reducing likelihood of thrombosis.(16) In a randomized, placebo-controlled study of 92 high-risk deep vein thrombosis patients traveling by airplane, when acute deep vein thrombosis is more likely, those in the NK treatment group experienced 60% less thrombosis events than did the control group.(17) Bromelain, an enzymatic contained in pineapple is another fibrinolytic and proteolytic agent with anti-inflammatory properties to boot. Animal and in vitro studies have shown its effectiveness in inhibiting thrombosis and platelet-aggregation by modulating plasmin-activator.(18,19,20)

Whole foods play an important part of CV health. Studies have linked increased fiber to colon health, cholesterol reduction and vascular health. Oats and oat bran for example, contain beta-glucan and saponins. Beta-glucan traps dietary cholesterol within the intestine, while saponins bind to cholesterol and bile acids. Whole wheat, notably wheat germ at supplemented levels, has been shown to decrease cholesterol levels. Active nutrients in wheat germ include vitamin E, lecithin and octacosanol. Other notable foods that lower CVD risk include flaxseeds, soy and other legumes for their isoflavonoids, lignans and various polyphenols, tomatoes for their lycopene and estimated 10,000 other phytochemicals, onions and peppers for their quercetin and sulfur/allicin compounds, apples for their pectin, rutin and quercetin and greenfoods for their phytochemicals and antioxidant flavonoids such as apigenin and luteolin. Anthocyanins from red and purple fruits have gained research attention recently for their CV benefits. Blueberries and tart cherries, notably the Montmorency variety, have the highest levels of these and other antioxidants, now measured by Oxygen Radical Absorbance Capacity (ORAC).(21,22,23)

Botanical Therapies

There are a number of botanicals that have shown preventative and therapeutic effects on cardiovascular health. Note that one should be careful to check the quality of any botanical supplement. Botanicals should be manufactured by a reputable manufacturer, preferably one with an in-house lab that can directly verify constituent levels and identify any heavy metals or microorganisms. Also it should be noted that significant effects from botanicals can take several weeks, and there can be interactions (some harmful, some beneficial) with pharmaceutical CV drugs.

Arguna, the bark of *Terminalia Arjuna* is a traditional ayurvedic cardiovascular herb. Constituents include arjunic acid, terminic acid, glycosides, plant flavones, tannins, oligomeric proanthocyanidins, pyrocatechol tannins and glucotannic acid, together with sodium, calcium salts, magnesium salts, and phytosterols. Arguna is recommended in Indian Materia Medica for endocarditis, mitral regurgitation, pericarditis, angina and as a heart tonic.(1,2)

Research: A number of clinical studies have shown arjuna extract's cardiac effectiveness. In a double-blind, placebo-controlled trial of 58 males with chronic stable angina, arjuna-treated patients had a significantly-decreased frequency of angina, and significantly better treadmill parameters.(2) In another placebo-controlled, randomized trial of 105 patients with elevated cholesterol, 35 patients not given other lipid-treatment were treated with arjuna for 30 days. Total cholesterol decreased from 9.7-12.7%, LDL cholesterol decreased from 15.8-25.6%, and lipid peroxide levels decreased significantly.(3) In an open study of ten patients with stable angina, arjuna treatment resulted in an 80% of patients having symptomatic relief.(4) In a placebo-controlled study of 12 patients with chronic congestive heart failure, patients treated with arjuna experienced an improvement of congestive heart failure symptoms, a decrease in echo-left ventricular enddiastolic and endsystolic volume indices, increased left ventricular stroke volume index and increased left ventricular ejection fractions.(5,6) In another study of 20 angina patients for 3 months, arjuna treatment resulted in a 50% reduction of angina episodes among stable angina patients, lowered systolic blood pressure and body mass index, slightly increased HDL-cholesterol and marginal improvement in left ventricular ejection fraction.(7). Safety was demonstrated in all studies.

Cayenne: *Capsicum frutescens* or *Capsacin annum L.*, has been used for medicinal purposes for many cultures around the world for thousands of years. Active constituents include capsaicin, capsaicinoids,

various carotenoids such as zeaxanthin, beta-cryptoxanthin, and beta-carotene, 23 flavonoids including quercetin, luteolin and chrysoeriol, steroid glycosides, vitamins A & C and volatile oils. Traditional use includes heart and circulatory system stimulant, platelet antiaggregator, antibacterial, antiviral and gastric stimulant.(1,2,3)

Research: A randomized-controlled human study showed that cayenne increased energy expenditure with an increase in sympathetic-parasympathetic nervous system ratio.(4) Cayenne has been connected to a lower risk of cardiovascular disease, thermoregulation, and in the delivery of potent carotenoids to heart and artery tissues.(2,3,5). Various chemical and in vitro studies have shown cayenne to be a potent antioxidant(3,6) with antifungal properties.(9) Cayenne has also been shown to reduce blood pressure, bradycardia and apnea in rats.(10)

Cilantro, *Coriandrum sativa*, has been used historically in traditional Chinese, Ayurvedic and other traditional medicines for thousands of years. It has 33 known constituents, including monoterpenoids, monoterpenoid glycosides, monoterpenoid glucoside sulfates and aromatic compound glycosides. Coriandrol, petroselinic fatty acid and pinene. Pharmacological actions include antimutagenic, antioxidant, alterative, carminative and chelating.(1,2)

Research: In vitro and in vivo studies show strong chelation properties in removing inorganic and methyl mercury,(3) having muscle relaxant effects,(4) antibacterial activity against salmonella, E. coli and bacillus magaterium,(5,6) having lowered cholesterol in mice by decreasing lipid uptake and enhancing lipid breakdown,(7) significant antimutagenic and antioxidant properties.(8,9)

Garlic, *Allium sativum*, has many uses in traditional medicine with more than 400 constituents and over thirty medicinal compounds. Constituents known for cardiovascular effects include ajoene, allicin, S-allyl-cystein, diallyl disulfide, methyl ajoene, 2-vinyl-4H-1,3-dithiin. In traditional CV therapy garlic has been used as an agent to lower blood pressure, thin blood, lower cholesterol, and a variety of antioxidant, anti-fungal and anti-bacterial uses.(1)

Research: Because of its heralded cardiovascular effects, garlic has undergone vigorous clinical examination in numerous studies, and although its blood lipid-reduction effects have had sometimes conflicting results,(2) it should be stated that active constituent levels after heating and extraction can be significantly lowered.(1). Even so, in a meta-study of 1798 reports, 45 randomized human trials and 73 additional studies with standardized mean differences from placebo-controlled trials, small yet verified reductions in total cholesterol, triglycerides and LDL levels at 1 and 3 months and significant reductions in platelet aggregation were concluded.(3) Other human and in vitro studies have concluded that garlic results in increased tissue blood flow,(4) platelet aggregation inhibition,(5,6,7) inhibition of thrombosis,(7) protection against oxidation and glycation of LDL cholesterol,(8) lowered artery-wall adhesion via cholesteryl ester transfer protein activity,(9) fibrinolytic activity, decreased artery wall thickening and structural changes related to aging, decreased atherosclerosis effects,(7) inhibition of endothelial cell injury, reduced LDL oxidation and greater artery wall cell viability.(10,11)

Ginger, *Zingiber officinalis*, has been used for thousands of years in traditional medicine throughout the world. It has at least 477 constituents, with active cardiovascular constituents including volatile oils zingiberone, bisabolene, camphene, geranial, linalool, borneol and oleoresin gingerols, shogaols, and zingerones among others. Actions include aromatic, carminative, stomachic, sialagogue and digestive.(1,2,3)

Research: In animal studies of rats, rabbits and guinea pigs, ginger extracts have been shown to reduce blood pressure through endothelium calcium channel blocking effects,(4,8) inhibit platelet aggregation,(5) reduce atherosclerotic lesion areas by 44%--triglycerides by 27%--cholesterol by 29%--VLDL by 36% and 53%--LDL by 58% and 33%, reduce oxidation capacity of LDL by 45-60%,(6,7) inhibit LDL oxidation and inhibit atherosclerosis,(9,10) modulate artery wall contraction,(11) increase atrial contractile force,(12) and reduce blood pressure, bradycardia and apnea.(13)

Grapeseed Extract, extract of *vitis vinifera* seed is one of the highest sources of bound proanthocyanidins called Procyanidolic oligomers, or "PCOs". Research has demonstrated that PCOs from grapeseed extract have various CV benefits.(1)

Research: In vitro studies and animal studies have shown grapeseed extract PCOs have antioxidant activity 20-50 times greater than vitamin E or C,(1) have protective and strengthening effects on the lining of artery walls by providing increases in conjugation enzymes,(2) cause increased ATP cellular metabolism,(3) create greater collagen fiber crosslinking,(4) decrease artery wall permeability,(5) increase glycoprotein and sulphated glycosaminoglycan synthesis,(6) inhibit hyaluronan-varicosis,(7) increase vascular wall strength by better adhesion of elastin fibroblasts and cells,(8) reinforce vascular connective tissue,(9) reduce elastin-associated cholesterol,(10) decrease incidence of multiple cerebral infarction,(11) lower risk and incidence of cerebral microvessel permeability(12) and decrease proteinuria.(13) A human clinical study on four groups of 10 varicose vein patients showed that PCOs increase venous tone as compared to placebo and controls.(14) In another human clinical trial, Grapeseed extract PCOs were given to 9 and 17 patients, resulting in increased plasma antioxidation and inhibition of LDL oxidation.(15)

Gugulipid, an oleoresin from the *Comiphora mukul* tree, is an ancient ayurvedic herbal medicine with thousands of years of usage in Asia. Constituents include volatile oil, guggul gum resins, and bitter principle. Active constituents include Z-guggulsterone and E-guggulsterone, which have shown lowering effects on serum cholesterol and triglycerides by increasing LDL metabolism by the liver. Actions include demulcent, aperient, alterative, carminative, antispasmodic and emmenagogue.(1,2).

Research: In a 12 week multicenter open trial of 205 patients after placebo therapy, 70-80% of patients had significant lowering of serum cholesterol at an average of 23.6%, serum triglycerides averaging 22.6%.(3) In a double-blind crossover study of 233 patients, 125 patients taking gugulipid therapy had an average fall in serum cholesterol of 11% and triglycerides of 16.8%, while HDL-cholesterol increased in 60% of patients.(3). Several other human studies have shown this effect, and several studies of rats, monkeys and rabbits have also shown gugulipid's cholesterol-lowering effects in hyperlipidemia, as well as lowered LDL, and regression of artery lesions.(4,5)

Hawthorn Berry, *Crataegus oxyacantha*, contains acetylcholine, proanthocyanidins, cariotonic amines, choline, cratagolic acid, flavonoids such as quercetin and rutin, glycosides, pectins, purines, saponins and triterpene acids. Hawthorne has been used traditionally for angina pectoris, valvular deficiency, endo-my and pericarditis, tachycardia, cardiac neuralgias, palpitation, and rheumatism of the heart.(1,2,3,4,17)

Research: A number of double-blind, placebo-controlled randomized human studies have shown efficacy with heart patients: A study of 143 cardiac failure patients hawthorn-treatment showed improvements in exercise tolerance.(5) In two studies of 24 hypotensive patients each, hawthorn-treatment was found to increase arteriole tone, effecting positive cardiac performance and inhibit orthostatic falls in blood pressure.(6) In eight trials of 632 patients with chronic heart failure, adjunctive hawthorn treatment was more beneficial than placebo, pressure-heart rates improved, dyspnea and fatigue significantly improved, and nausea, dizziness, cardiac and gastrointestinal complaints were less frequent.(7) A study of 24 patients showed hawthorn treatment had a stabilizing effect on arterial pressure in orthostasis.(8) A study of 209 heart patients treated for 16 weeks showed significant increase in exercise capacity of hawthorn-treated patients.(9) A study of 36 hypertensive patients showed hawthorn-treated group had a reduction in the rest diastolic blood pressure and reduction in anxiety after 10 weeks of treatment compared to other groups.(10) A three-month study of 88 congestive heart failure patients concluded increases in exercise times, quality of life, and improved dyspnea among hawthorn-treated patients.(11) A study of 16 patients with congestive hear failure resulted in significantly increased contraction force, frequency-dependent force generation in hawthorn-treated group.(12) In a study of 136 patients with cardiac insufficiency, hawthorn-treated patients showed improved cardiac pressure, heart rate product and better quality of life while placebo patients progressively worsened.(13) In a study of 30 patients, hawthorn-treated group had improved exercise pressure-rates and decreased heart rates as compared to placebo.(14) In an open study of 1011 patients with cardiac insufficiency, hawthorn treatment resulted in a significant improvement of the clinical symptoms of exercise tolerance, fatigue, palpitation and dyspnea. Hawthorn-treated patients had lower resting pulses, reductions in ST depressions, arrhythmias and ventricular extrasystoles, and improved myocardial perfusion.(15) In a crossover trial of 8 volunteers hawthorn was found to be safely coadministered with digoxin.(19) Animal studies have shown hawthorn to lower lipid levels and ischemia,(50) reduce artery endothelial damage, increase artery flexibility,(2) dissolve artery deposits,(3) inhibit LDL oxidation(15) and inhibit platelet-aggregation.(45)

Other botanicals: Other botanicals that have been used in natural therapy for their various CV benefits include Turmeric for its antioxidant and anti-inflammatory effects, Fo-ti for its lipid and circulation benefits, Wild yam for its cholesterol-modulating effects, Reishi for its cholesterol-modulating and blood pressure-lowering benefits, Ginkgo for its antioxidant and circulatory effects, and others. Hopefully botanical research for CV health will continue to progress.(1)

Exercise

Exercise is critical in CVD prevention. In the 60s and 70s Dr. Kenneth Cooper trail-blazed the science of aerobic exercise and studied its various cardiovascular benefits. Over the years since Dr. Cooper's research numerous studies have shown aerobic exercise provides significant heart disease protection. Aerobic exercise has been found to increase blood HDL levels, decrease total cholesterol, total triglycerides and LDL, increase vital lung capacity, lower heart rate, decrease risk of blood clots, decrease inflammatory factors, improve mood and lessen the effects of stress, lower blood pressure, help increase metabolism and thus decrease the risks of diabetes and obesity. Recent research regarding exercise following a coronary event has shown that carefully-monitored exercise programs can greatly increase healing and prevention of recurrence.(1,2)

Stress

Stressful, demoralizing or traumatic events have been linked with cardiac episodes. A stressful lifestyle without healthy release has been shown to increase hypertension and inflammation. The 'fight or flight' response activates the sympathetic nervous system, increasing adrenal release, heart rate, and breathing rate, while shutting down circulation to internal organs in the body's preparation for muscular response. Unreleased stress can result in anxiety, high blood pressure, adrenal fatigue, digestion disruption and the potential for destructive stress-release habits such as smoking or drinking.(1,2,3)

Although coping styles vary dramatically, there are several activities that can reduce CV effects. Exercise increases dopamine and endorphin release and releases that 'fight or flight' muscular response. Massage is also valuable for its ability to increase circulation and promote relaxation. Deep breathing and relaxation techniques such as guided imagery are also very helpful for balancing stress. Foods that have a calming effect upon the body include lettuce, basmati rice, yogurt, soy and other beans, yam, and oats. Herbs that relax and reduce stress response include kava, California poppy, lemon balm, passionflower and valerian. Meditation and prayer are also important tools for not only stress-reduction and coping, but for their all-important spiritual benefits.(3)

Conclusion

A substantial body of evidence allows the alternative practitioner to significantly decrease the risk of cardiovascular events without pharmaceuticals. A simple nutritious diet and plenty of exercise can go a long way toward preventing CVD. However, incorporating proven nutritional, botanical and lifestyle therapies allows alternative practitioners the potential to impact a wider population base in an attempt to curb this worldwide epidemic.