Natural Approaches In the Treatment of Congestive Heart Failure

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Tens of millions of people worldwide including nearly 5 million Americans suffer from congestive heart failure (CHF), and the number of CHF patients has grown markedly over the past 40 years. The risk for developing heart failure is slightly greater in men than in women. African-Americans are twice as likely to acquire the disease as Caucasians, and mortality from the disease is also twice as great in this group. Approximately 20% of CHF patients will die within one year of diagnosis, 50% will die within five years, and patients' quality of life often is poor even when therapy is maximized.

Heart failure is the leading cause of hospitalization in people over the age of 65, and the risk for developing the disease increases with age. Since the 1970s, heart failure has been on the increase because the number of people aged 65 or older has grown. Because this population is expected to continue to grow, an increase in cardiovascular morbidity is predicted.[1] *Most experts believe that the incidence of CHF will continue to grow as the population ages and more people survive heart attacks.*[2]*.*

Conditions Leading to CHF

CHF is a very serious condition in which the heart does not pump enough blood to meet the body's needs. This can lead to congestion within the lungs, as blood flows backward from the heart. When this congestion begins, the patient may experience clinical symptoms of varying severity. CHF is a multi-faceted condition that involves several organ systems, including the heart, kidneys, vascular system, and brain, as well as various neurohumoral factors.

CHF is the result of pathophysiological changes in the functions of the heart caused by underlying conditions such as the long-term effects of high blood pressure (hypertension), previous heart attack (myocardial infarction), arrhythmia, coronary heart disease, heart valve disorders, cardiomyopathy, or chronic lung disease. These conditions produce CHF by affecting the ability of the heart to contract properly. Other conditions that may lead to CHF include congenital heart disease, diabetes, anemia, obstructive sleep apnea, lupus, rheumatoid arthritis, hyperthyroidism, certain chemo-therapy drugs, alcohol abuse, and abuse of drugs such as amphetamines and cocaine. Additionally, the risk of developing CHF is increased by lifestyle and dietary factors such as smoking, obesity, lack of exercise, high salt intake, emotional distress, and fluid overload.

With CHF, the heart has to work harder to try to make up for its reduced pumping ability. The more the heart overworks, the more its pumping ability is compromised and the more likely serious pumping failure will occur. This increased workload can lead to dangerous physical changes such as enlargement of the heart, hypertrophy of the heart wall, tachycardia (rapid heart beat), and kidney malfunction.

Different Types of Heart Failure

The heart comprises two independent pumping systems, on the right side and left side of the heart. Each has two chambers, called the atrium and the ventricle. The ventricles are the major pumps in the heart. The right system receives blood from veins throughout the entire body. This blood has already circulated throughout the body and as a result is lacking in oxygen and rich in carbon dioxide. The left system receives the blood from the lungs. The left ventricle is the strongest of the heart's pumps.

The two types of heart failure are distinguished by which side of the heart (left or right) is most affected. When the left side of the heart (left ventricle) cannot pump blood adequately from the heart to the rest of the body, the symptoms include shortness of breath, fatigue, and coughing (especially in a horizontal position). When the right side (right ventricle) is not working properly, the return venous blood is worsened, which results in fluid retention and the patient experiencing swelling in the legs and ankles.

CHF is further categorized according to which phase of the heart's pumping cycle is more affected. The two types of CHF are systolic and diastolic. In systolic CHF, the heart is unable to pump adequate amounts of blood during its contraction (systole). Typical symptoms of systolic CHF are lung congestion and swelling of the lower extremities. In diastolic CHF, the heart is unable to relax between contractions (diastole) and does not allow enough blood to enter the ventricles. Symptoms are identical to those of systolic CHF.

The New York Heart Association developed the following classification system to grade CHF by severity of sym

Class I. No limitation of physical activity. No shortness of breath, fatigue, or heart palpitations with ordinary physical activity.

Class II. Slight limitation of physical activity. Shortness of breath, fatigue, or heart palpitations with ordinary physical activity, b

Class III. Marked limitation of activity. Shortness of breath, fatigue, or heart palpitations with less than ordinary physical activity

Class IV. Severe to complete limitation of activity. Shortness of breath, fatigue, or heart palpitations with any physical exertion

Conventional and Complementary Treatment Options

Current CHF treatment options include both conventional and complementary approaches. Because this article focuses on natural agents for the treatment of CHF, we will consider only briefly conventional treatment of CHF.

Conventional Treatment

CHF is a particularly difficult malady, as no single drug can fully relieve its symptoms. The first step in managing CHF is to treat the primary conditions causing the disease. These typically include one or more of the following: coronary artery disease, valvular abnormalities, high blood pressure, arrhythmia, anemia, and thyroid dysfunction. Treating heart failure itself as early as possible offers the best chance for a longer and better-quality life.

Several classes of medication are used to treat heart failure: diuretics (which reduce fluid), ACE (angiotensin-converting enzyme) inhibitors (which open blood vessels), beta-blockers (which slow heart rate), digoxin (which increases the heart's ability to contract), and vasodilators (agents that open blood vessels). Diuretics and ACE inhibitors have the best track record to date for treating CHF patients.

Depending on the severity of the damage and dysfunction, interventional procedures may be necessary, including balloon angioplasty, coronary stenting, coronary artery bypass surgery, heart valve surgery, pacemaker insertion, and heart transplantation.

Complementary Treatment

Complementary approaches to treating CHF include lifestyle modifications and alternative remedies or natural agents. First of all, the patient must be aggressive about maintaining a healthy, optimal weight to reduce unnecessary strain on the heart. Individuals with CHF must avoid heavy alcohol intake and restrict their salt intake. With worsening heart function, it may be necessary to limit sodium intake to 2 grams per day and ingestion of water to 1.5–2 liters per day. CHF patients also are advised to increase their use of monounsaturated oils, such as extra virgin olive oil,[3] foods high in essential fatty acids,[4-8] and fruits, vegetables,[9-11] and fiber.[12] Patients may be advised to increase their intake of garlic, onions, and celery, as these foods have been shown to lower blood pressure.

Supplementation with essential nutrients is critical for patients suffering from CHF. Vitamins and other nutrients serve as bioenergy carriers to millions of heart muscle cells. The natural approach focuses on improving myocardial energy production. Numerous clinical studies have demonstrated the value of vitamins and other nutrients in treating conditions such as shortness of breath, edema, and other symptoms of CHF. The most comprehensive clinical studies have tested coenzyme Q10 (CoQ10) and carnitine, both carrier molecules of bioenergy in the heart.[13,14]

Most patients with CHF symptoms have been shown to be significantly malnourished. Specific deficiencies that have been found in the failing myocardium include: a reduction in L-carnitine, CoQ10, creatine, and thiamine, which are important nutrient cofactors for myocardial energy production; a relative deficiency of taurine, an amino acid integral to intracellular calcium homeostasis; and increased myocardial oxidative stress with a reduction of antioxidant defenses. Deficiencies of carnitine or taurine result in dilated cardiomyopathy in animals and humans. Each of these deficiencies can be corrected through dietary supplementation. A comprehensive restoration of adequate myocyte nutrition is critical to any therapeutic strategy designed to benefit patients suffering from CHF.[15,16] Supplementation that results in higher myocardial levels of CoQ10, taurine, and carnitine levels is associated with a reduction in left ventricular end-diastolic volume in patients with left ventricular dysfunction.[17]

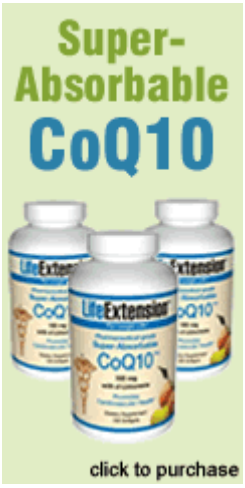
Successful complementary treatment requires formulating an individualized protocol that addresses the various pathophysiological changes that occur during the development and progression of CHF. The goal of utilizing natural agents in treating are:

- Restoring neurohormonal and metabolic integrity
- Improving myocardial energy and pumping function
- Decreasing oxidation stress
- Restoring mineral balance
- Decreasing vascular resistance
- Preventing risk of thrombosis
- Preventing arrhythmia or improving rhythm disorder
- Using nutrients that can improve the conditions of diseases that cause CHF

The keys to enhancing cardiovascular health are effectively managing the negative effects of stress, antioxidant protection, strengthening the heart and vessels, and reducing the occurrence of calcification through chelation therapy.

Supplements for Cardiovascular Health

Coenzyme Q10 CoQ10 has been used for decades as a nutritional supplement for cardiovascular disease.[18] It is found in high concentrations within the mitochondrial membranes of organs that have significant energy requirements, and is essential for the high-level functioning of the heart. CoQ10 is involved in energy production[19-22] and exerts antioxidant[23] and membrane stabilizing[24] effects. The first clinical application of CoQ10 in cardiovascular disease was reported in 1967.[25] Since that time, numerous studies have evaluated the use of CoQ10 to treat CHF. As the most important element of the respiration chain of each cell, CoQ10 plays a particular role in improved heart muscle function because of the heart muscle cells' high bioenergy demand. Most studies have found CoQ10 to have beneficial effects on the heart's ejection fraction,[26-28] end-diastolic volume index,[27,29] development of pulmonary edema,[30] and other CHF symptoms.[31,32] In one study, withdrawal of CoQ10 resulted in decreasing cardiac function and symptoms.[33] Two other studies suggested improvement in CHF survival rates when CoQ10 was added to conventional therapy.[34,35]



While the optimal dose of CoQ10 for treating CHF has not been defined, studies have utilized dosages ranging from 30 to 600 mg daily, and most practitioners prescribe 100-300 mg daily.

Carnitine Another vitamin-like substance, carnitine, is essential in the transport of fatty acids into the myocardium and mitochondria for energy production. Carnitine appears to have beneficial effects on CHF.[36] If the heart does not have a good oxygen supply, then carnitine levels decline quickly. Several double-blind clinical studies have shown that carnitine improves cardiac function in CHF patients.[37-39] The longer carnitine was used, the more dramatic the improvement. After six months of use, patients' ejection fraction increased by 12.1% and 13.6%, respectively.[38,39] Chronic administration of carnitine has been shown to improve ventricular function, reduce systemic vascular resistance, and increase exercise tolerance.[38,40] The dosage used in most studies is 1-3 grams daily.

Taurine The amino acid taurine is an important nutrient found in very high concentrations in excitable tissue. Its lack in heart muscle cells is a particularly frequent cause of heart failure. Generally, CHF responds favorably to taurine therapy. In double-blind studies, taurine supplementation has been shown to reduce signs and symptoms of CHF.[41,42] Taurine promotes natriuresis (sodium excretion) and diuresis (urine excretion), and minimizes many of the adverse actions of angiotensin II, including the induction of cardiac hypertrophy, volume overload, and myocardial remodeling. Since ACE inhibitors are the mainstay treatment for CHF, taurine supplementation is extremely important.[43] The recommended dosage is 2-3 grams daily.

Hawthorn (or its related species) Herbs in the hawthorn family have been used in the treatment of cardiovascular diseases.[44] Clinical studies have found that standardized extracts of these herbs show promise as supplementary agents for the treatment of left ventricular dysfunction.[45-48] Other trials consistently demonstrate hawthorn's ability to improve exercise tolerance as well as symptoms associated with mild to moderate CHF.[49,50] Its effectiveness has been demonstrated repeatedly in double-blind studies.[45,47,51] Hawthorn extract shows some beneficial effects in animal and human studies, including enhanced heart pumping efficiency (improved contractility), ACE inhibition, antidysrhythmic effects, and mild reduction in systemic vascular resistance.[49,52,53]

The recommended daily dose ranges from 160 to 900 mg.

Magnesium Magnesium plays an important role in the functioning of the cardiovascular system. A decrease in magnesium has been linked with tachydysrhythmias (fast, irregular heartbeats) and increased mortality in CHF patients.[54] The research shows that use of magnesium supplements in these situations may be beneficial for treating and preventing life-threatening conditions. Magnesium supplements can be administered safely either orally or by injection depending on the situation.[55,56] In one study, patients with severe CHF took a supplement of 300 mg of oral magnesium citrate daily for 30 days. In some of these patients, oral magnesium supplementation was effective in achieving substantial increments in intracellular magnesium.[55]

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Alpha Lipoic Acid Scientists at The Linus Pauling Institute measured DNA damage in rat hearts and found that old hearts produce three times more free radicals than young hearts. The scientists then gave old rats alpha lipoic acid for just two weeks before their death. Necropsy findings showed that heart muscle cells from these old rats given alpha lipoic acid did not differ from those of un-supplemented young rat hearts. The scientists concluded their study report by stating that "the aging rat heart is under increased mitochondrial-induced oxidative stress, which is significantly attenuated by lipoic acid supplementation."

Since oxidative stress plays a role in the development and progression of CHF, it would appear prudent for CHF patients to supplement with at least 250 mg of alpha lipoic acid each day.[57]

ADDITIONAL natural agents THAT may be useful IN treating CHF patients:

- **Vitamin C:** energy supply for the metabolism of each cell
- **Vitamin E:** for anti-oxidative protection
- **Vitamins B1, B2, B3, B5, B6, and B12:** bioenergy carriers of cellular metabolism, particularly for the heart muscle cells; for heart function and pumping, and physical endurance
- **L-arginine:** vasodilatory effects (2-5 grams daily)
- **Creatine:** for cardiac function
- **Fish oil supplementation**
- **Potassium** (if CHF is associated with hypokalemia or low potassium levels).

It is important to stress that no supplement or diet can cure CHF. Age is the most powerful risk factor for heart disease. Because of the system-wide effects of andropause and menopause, hormones like testosterone may offer cardiovascular protection. Everyone recognizes that the risk of developing CHF increases with age, but the fact that the increased risk may be tied to reduced gonadal testosterone production has not yet been completely accepted by practitioners of conventional medicine.

Hormone Therapy

The normal condition of a living organism is a delicate balance between anabolic and catabolic processes. CHF results when catabolic influences come to predominate, leading to the accumulation of excess cholesterol, impaired carbohydrate metabolism, decreased fibrinolysis, and other well-known symptoms. The dominance of catabolic process is associated with a rise in the cortisol, a decline in DHEA and decreased testosterone levels. These changes correlate with changes in the body mass index and clinical severity of heart failure, suggesting a possible

causal link between the two.[58,59] The primary anabolic hormone is testosterone; the primary catabolic hormone is another steroid, cortisol.

Neuroendocrine function has a very close relationship with metabolism and is usually abnormal in CHF patients.[60] Several studies show these patients have relatively low levels of DHEA, testosterone, estrogen, and IGF-1.[61-66]

Testosterone therapy has been proposed as an additional treatment for men with CHF.[67] Testosterone reduces blood pressure and enhances relaxation of brachial arteries; direct injection of testosterone into the coronary arteries produces dilatation and increased coronary blood flow.[68-70] The resulting vasodilator effect may relieve pulmonary congestion and improve peripheral perfusion. Androgen therapy could also improve cardiac function by reducing the stress on the heart muscle both before and after contraction as well as by increasing coronary blood flow. Additionally, androgen therapy is useful in augmenting skeletal muscle strength in CHF patients.[71] Androgen replacement therapy could potentially alleviate symptoms by improving cardiac and vascular function as well as by increasing strength and endurance. It may also redress the catabolic-anabolic imbalance of CHF and suppress the cytokine activation that leads to the disease's progression.

Optimal levels of steroid hormones such as pregnenolone, DHEA, progesterone, estrogen, testosterone, and cortisol are necessary for maintaining optimal health in both males and females. Alteration in these hormones may play a significant role in CHF. In one study, patients received hormonorestorative therapy with hormones such as pregnenolone, DHEA, triestrogen gel, progesterone gel, and testosterone gel for correcting high levels of cholesterol.[72] One hundred percent of the patients responded. This is because the human body contains all the enzymes and cofactors it needs to process natural hormones when they occur in their natural human proportions. Hormono-restorative therapy promises to be an important therapeutic protocol in the treatment of CHF, along with supplements that naturally enhance cardiac output.

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