The Heart-Harming Effects of Elevated Cortisol

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When we consider heart disease risk factors, we often think of cholesterol, homocysteine, C-Reactive Protein (CRP) and fibrinogen. However, research is finding that another overlooked factor may play an equally important role in heart health. This factor is high cortisol levels.

Over the last several decades, studies have consistently linked lack of social support, low socioeconomic status, unhappy marriages and work stress with an increased incidence of cardiovascular disease.1-3

Dysregulation of the hypothalamic-pituitary-adrenal axis, which helps control the output of cortisol, is emerging as a likely reason why increased emotional stress is linked to cardiovascular disease. In healthy persons, cortisol levels peak approximately 30 minutes after awakening and levels decline throughout the day, bottoming out around midnight. Physical or emotional stress such as exercise or emotional arousal—even eating a lunch meal—activates the HPA axis. As a result, there is a short-term rise in cortisol.4-5

Exposure to chronic stressors such as perceived work stress, marital problems, and unemployment and high financial strain cause an increase in cortisol levels and a smaller decline in cortisol levels throughout the day. The same cortisol elevation occurs in men with overall negative affect (in other words, men who react negatively to situations they experience) and women undergoing a divorce or separation.6-10

The Cortisol Connection

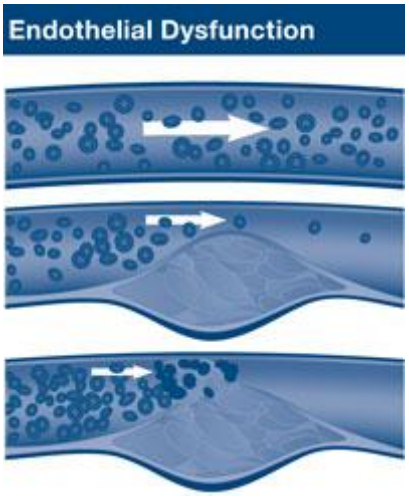
A number of studies have established a link between cortisol levels and heart disease. In a study published earlier this year, 514 healthy men and women without history or objective signs of coronary heart disease were exposed to mental stressors under laboratory conditions. Salivary cortisol and coronary artery calcification were measured in the subjects. Approximately 40 percent of the sample responded to the stress tasks with a notable increase in cortisol and the cortisol response group demonstrated a higher risk of significant coronary artery calcification.11

This led the researchers to conclude “These data support the notion that heightened hypothalamic pituitary adrenal activity is a risk factor for CHD.”

Another study of 85 healthy women who were 6 months to 5 years postmenopausal found that higher cortisol levels were associated with cardiovascular risk factors such as lower levels of HDL “good” cholesterol and increased waist girth and insulin resistance. Higher scores on a scale measuring menopausal symptoms were also associated with higher cortisol levels.12

Researchers collected more evidence to link cortisol to heart health when they studied 1,866 elderly participants. The subjects provided four salivary cortisol samples throughout 1 day, and underwent ultrasonography to examine the presence of plaques in both carotid arteries. Total cortisol exposure while awake was associated with higher plaque scores. Subjects with the highest cortisol levels while awake had a higher number of plaques on the carotid arteries compared with those with the lowest levels.13

According to the researchers, “Our results support the hypothesis that increased total cortisol exposure is independently associated with atherosclerosis of the carotid arteries.”



Providing more evidence that increased cortisol is linked to heart disease is the connection between endothelial dysfunction and cortisol levels in Cushing’s syndrome patients. Endothelial dysfunction (the dysfunction of the cells lining the blood vessel walls) is considered to be an initial event in the development of cardiovascular disease. In Cushing’s Syndrome patients, endothelial dysfunction was found to be related to high cortisol levels. Furthermore, the endothelial dysfunction was ameliorated after correction of cortisol excess by surgical and medical treatment, and the reduction of morning cortisol levels after treatment correlated with the improvement of endothelial function.14

Explanation for Its Damaging Effects

Elevated cortisol levels can wreak havoc on the human body. Normal levels of cortisol are necessary to regulate the immune system, glucose and lipid metabolism, and maintain cardiac output by increasing vascular tone and decreasing vascular permeability. Dysregulation of the HPA axis, on the other hand, where cortisol levels are disrupted, is associated with hypertension,15 increased heart rate and increased levels of total and low-density lipoprotein cholesterol and fasting insulin and glucose.16-18

The explanation behind why HPA axis dysfunction can play a role in atherosclerosis may involve one or more factors. Cortisol increases glucose levels and is an important factor in the development of diabetes mellitus, a condition which is linked to increased heart disease risk.18 One study in human subjects found a strong connection between total cortisol exposure and diabetes mellitus.13 However, this same study supports the mounting evidence that the effect of cortisol on the heart may have nothing to do with traditional cardiovascular risk factors.13 In this study, levels of systolic blood pressure, total cholesterol, and HDL cholesterol did not explain the association between total cortisol exposure and increased number of plaques on the arteries.13 This and other studies indicate that cortisol may have direct effects in the blood vessel wall.

These direct effects may include inflammation, which may prove to be a key factor in cortisol’s damaging effect on the heart. Inflammation is strongly implicated in the development of atherosclerosis and increased local cortisol levels in the blood vessels may promote perivascular inflammation.19-21

The greater the degree of inflammatory activity, both within the atherosclerotic plaque and in the circulation, the greater the plaque destabilization and complications of blood clots.22

Furthermore, research indicates that glucocorticoids, which are used to treat inflammation, may enhance calcification within arteriosclerotic lesions.23

In one analysis of studies investigating the effects of cortisol in coronary atherosclerosis and myocardial infarctions (heart attacks), the reviewers concluded, “The results consistently point towards a dysregulated cortisol secretion that may involve a failure to contain inflammatory activity.”22

Cortisol-Controlling Strategies

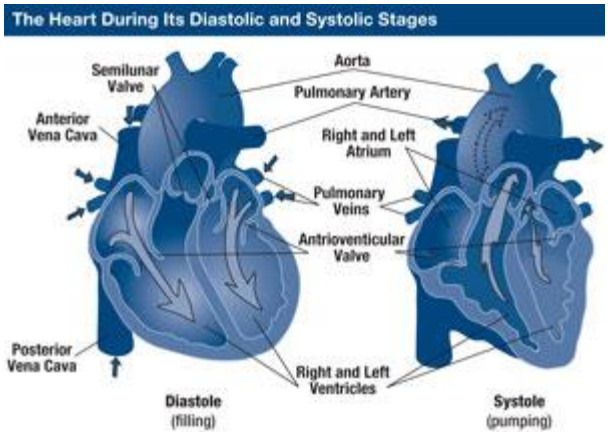
The first step is to test for cortisol levels by using a salivary hormone test (Adrenal Function Panel). If the results of this test indicate elevated cortisol levels, then a good approach is to begin supplementing with a combination of Relora® (a proprietary blend of a patented extract from Magnolia officinalis bark and a patent-pending extract from Phellodendron amurense) plus Sensoril®, a patented form of Ashwagandha (Withania somnifera) root and leaf extract standardized to 8% withanolides. Relora has been found to lower elevated cortisol levels in human subjects and to control stress-induced symptoms, such as depression, anxiety, irritability, emotional ups and downs.24

Sensoril is a carefully balanced formulation of the key compounds that provide Ashwagandha’s immunomodulating and anti-stress activity. By optimizing the ratio of oligosaccharides to polysaccharides, the formulation protects the withanolides in Ashwagandha from digestive inactivation and enhances their absorption. When given to rodents that were subjected to stressful conditions, Sensoril prevented the enlargement of adrenal glands that usually occurs while under stress and reduced the adrenal depletion of cortisol that occurs when it is released into the body to counteract the effects of stress.25

Combining Cortisol Control with AdaptaPhase® I can offer additional support. Adaptogenic herbs such as Eleutherococcus senticosus, Ashwagandha (Withania somnifera), and Schisandra chinensis (all found in AdaptaPhase® I) can be highly effective in promoting recovery from stress and stabilizing cortisol levels.26 Schisandra and Eleutherococcus have been shown to increase endurance and mental performance and attention in patients with fatigue in several studies, likely by modulating the HPA axis and controlling cortisol levels.27 Schisandra chinensis is often considered to be a useful tool in modern Chinese medicine. However, Schisandra chinensis had been widely researched by Russian scientists in the 1940s and 1950s and first gained recognition as an adaptogen in the official medicine of the USSR in the early 1960s. In addition to having anti-stress effects, it has also improved heart health in an experimental model of atherosclerosis.28

Support for a Healthy Heart

A combination approach to stop the damaging effects of cortisol on the heart includes supplementing with both the cortisol-lowering supplements mentioned above plus heart-supporting nutrients. Coenzyme Q10, taurine, L-arginine, hawthorn, carnitine and Salvia miltiorrhiza (all found in CardioCare) support overall heart health. Coenzyme Q10 is essential to cellular energy processes and thus assumes importance in cells with high-energy requirements such as the cardiac cells, which are extremely sensitive to CoQ10 deficiency produced by less than optimal cardiac health.29



Additionally, secretion of adrenal hormones are related to CoQ10 levels and plasma CoQ10 alterations are known to occur in pituitary diseases.30

Hawthorn and Salvia are two botanicals important for healthy heart function. A review of the medical literature found that hawthorn extract may improve symptoms in patients with mild to moderate heart failure, significantly enhancing exercise tolerance and reducing shortness of breath and fatigue. Hawthorn extract also increased the maximum workload.31 Salvia miltiorrhiza protects cardiac cells known as myocytes from damage and has protected animal hearts from injury after oxygen deprivation.32-33

Other cardiac nutrients include taurine and L-arginine, which are important for maintaining a regular heart rhythm.34 In Cushing's syndrome patients, higher cortisol concentrations were associated with lower levels of serum taurine and higher urinary excretion rates of taurine, indicating that high cortisol levels may deplete levels of taurine.35 Carnitine is another amino acid important to proper cardiac functioning. It reduces LDL oxidation, the process by which free radicals damage lipids in the body and play a role in LDL's heart-damaging effects.36

Conclusion

Mounting evidence indicates the heart is vulnerable to the effects of high cortisol levels and a disrupted HPA axis. A salivary hormone test can determine cortisol levels and a proactive program to lower cortisol levels and maintain heart health can be undertaken based on the test results. An effective approach includes supplementing with Relora and Sensoril (Cortisol Control), the adaptogenic herbs Eleutherococcus senticosus, Ashwagandha (Withania somnifera), and Schisandra chinensis (found in AdaptaPhase I) plus the heart-supporting nutrients coenzyme Q10, taurine, L-arginine, hawthorn, carnitine and Salvia miltiorrhiza (found in CardioCare).

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