



GENERAL ACUPUNCTURE

# A Dark Shadow Over America

## EATING OURSELVES TO DEATH

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The epidemic rise in obesity in America is foreshadowing a rising death rate from heart attacks and strokes. Epidemiologists recently pointed out that the new generation of Americans being born this year are expected to have a lower life expectancy than their parents, reversing the upward trend in longevity that has been present for 100 years.

However, recent research indicates the American medical system has been wrong about the causes of heart disease and strokes. We have blamed high cholesterol as the cause for a variety of reasons, including flawed research studies. Drug companies have maintained that statin drugs reduce the incidence of these diseases. All the statin drugs have many side effects, are expensive and do not address the real causes of arteriosclerosis. They have some benefit in the group of middle-age men already at high risk for heart disease. However, the benefit has nothing to do with lowering cholesterol, which actually might be a bad thing (we need the cholesterol made in the liver, which statin drugs block).

We now know that arteriosclerosis is due to two pathologic processes: oxidative damage and chronic inflammation. Here is a list of risk factors:

- obesity;
- poor diet consisting of foods with a high glycemic index;
- lack of exercise or inadequate exercise
- poor stress management, leading to chronic adrenal overstimulation;
- smoking;
- diabetes;
- hypertension; and
- genetic predisposition (only a small contribution).

### How This Fits Together

First, let's talk about how obesity and diabetes are linked. It all starts with what we eat. The consumption of a high-carbohydrate diet results in high glucose levels in the bloodstream. This causes high insulin secretion by the pancreas, which drives glucose into the cells and thus lowers blood glucose. The pancreas then stops secreting insulin, which results in insulin levels dropping to the normal low level between meals. This is what happens in the healthy individual.

Excessive intake of foods that rapidly convert to glucose causes a glucose overload. High insulin levels can't drive all the glucose into the cells, which are then assaulted by the high insulin levels. Over time, with many such meals, the cells become resistant to insulin. The insulin can't drive even adequate amounts of glucose into the cells, and glucose levels rise in the bloodstream. When the fasting glucose level reaches more than 125 mg/dL, the person has become diabetic.

In most cases, such an individual has become obese. However, the obesity comes first, so let's back up a minute. When the person develops insulin resistance, even though they are not yet diabetic, the insulin levels remain high all the time. With a typical American high-fat intake as well, this leads to fat deposition, especially in the abdomen and trunk area, high serum lipids (especially triglycerides and LDL), fat deposition in the liver and hypertension. This combination of pathological changes is known as syndrome X or metabolic syndrome.

Sadly, a high percentage of Americans now have metabolic syndrome, which often leads to diabetes. As most Americans consume a diet too high in both carbohydrates and fats, the building blocks for this fat deposition and accumulation in the bloodstream are in place. The problem is made worse if the person does not get adequate exercise on a daily basis. It's further aggravated by poor stress management.

### How Obesity Is Related to Blood Vessel Disease

We now know that blood flow to body organs is modulated by endothelial cell lining. The blood vessels release nitric oxide, which relaxes the blood-vessel smooth muscle to cause dilation of the blood vessel and increase blood flow. Nitric oxide also causes the vessel walls to remain slippery, resistant to the deposit of fats, platelets or fibrin. It also causes platelets to remain slippery so they don't adhere to each other in the early formation of a blood clot or fibrin deposition on the walls of the blood vessels.

Obesity and high insulin levels cause reduced endothelial secretion of nitric oxide, with a marked decrease in the amount of blood vessel dilation. This decrease in nitric oxide also results in blood vessels and platelets that are stickier. Rising inflammation and excessive oxidation levels associated with obesity and poor diet also predispose to stickier blood vessels. In this situation, high insulin levels open up cellular membranes, leading to the likely deposition of fats, oxidized cholesterol, fibrin and macrophages in the tiny clefts of blood vessels between epithelial cells, as well as within them. This results in atherosclerosis and arteriosclerosis. (Atherosclerosis is the deposition of plaques that occlude blood vessels; arteriosclerosis refers to a general thickening and hardening of the arteries.)

Preliminary studies have shown that those who are obese have a decreased blood-vessel dilation response throughout the body, which improves rather markedly after significant weight loss (15 to 20 pounds). Over time, this will improve survival rates and decrease the rates of heart attacks and strokes.

### Lifetime Cost of Diabetes

Those who develop diabetes face a lifetime disease, with a vast number of potential complications affecting virtually every organ in the body. Obesity and improper diet also are strongly correlated with increased risk for many forms of cancer. Inflammation is a natural process the body uses to ward off infection. However, modern diets, accompanied by little or no exercise, promote inflammation in tissues where there is no actual infection or perhaps just a low-grade infection. This chronic inflammation fosters the proliferation of abnormal cells that can lead to cancer.

Recent studies indicate that saturated fats might be less likely to promote inflammation than polyunsaturated fats such as vegetable oils, which have many unstable carbon bonds in their molecular structure. Hydrogenated trans-fats also are likely to initiate inflammation. Somewhat surprisingly, recent research indicates the best and safest fats are natural unprocessed fats of animal origin, found in butter, milk products and meats. Cholesterol in eggs also has been found to be

essential for health.

Recent studies investigating the links between obesity, diabetes and cardiovascular disease and cancer underline the importance of weight management. We are eating our health care system into a situation where we will not be able to pay all our bills. This could well lead to our insolvency as a nation.

### Resources

1. Muniyappa, et al. Cardiovascular actions of insulin. *Endocrine Rev*, 2007;28(5):463-91.
2. Keogh, et al. Effects of weight loss from a very low carbohydrate diet on endothelial function and markers of cardiovascular disease risk in subjects with abdominal obesity *Am J Clin Nutr*, 2008;87:567-6.
3. Hamdy, et al. Lifestyle modifications improves endothelial function in obese subjects with insulin resistance syndrome. *Diabetes Care*, 2003;26:2119-25.
4. Furchgott, et al. The obligatory role of endothelial cells in the relaxation of arterial smooth muscle by acetylcholine. *Nature*, 1980;288:373-6.
5. Caballero. Endothelial dysfunction in obesity and insulin resistance: a road to obesity and heart disease. *Obesity Research*, 2003;11:11.
6. Bohlen. Protein kinase in beta-II Zucker obese rats compromises oxygen and flow-mediated regulation of nitric oxide formation. *Am J Physiol Heart Circ Physiol*, 2004;286:H492-7.
7. Meyer, et al. Improvement of early vascular changes and cardiovascular risk factors in obese children after a six month exercise program. *J Am Coll Cardiol*, 2006;48:1865-70.
8. It's Never Too Late to Start Exercising and Losing Weight to Have a Healthier Cardiovascular System, Joslin Study Shows." [www.hms.harvard.edu/news/pressreleases/jos/1203exercise\\_cardiohealth.html](http://www.hms.harvard.edu/news/pressreleases/jos/1203exercise_cardiohealth.html).
9. Terata, et al. Acetylcholine-induced arteriolar dilation is reduced in streptozotocin-induced diabetic rats with motor nerve dysfunction. *Br J Pharmacol*, 1999;128:837-43.
10. "Relax (Your Blood Vessels) and Lower Your Cholesterol." Science Daily. <http://www.sciencedaily.com/releases/1998/07/9807210800226.htm>.
11. Fratkin. "Treating Metabolic Syndrome." *Acupuncture Today*, 2008;9(4):34. <http://www.acupuncturetoday.com/mpacms/at/article.php?id=31708>.

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