

Meta-analysis boosts vitamin C's heart benefits

Daily supplements of vitamin C may lower levels of LDL (bad) cholesterol by five per cent, and subsequently reduce risk factors linked to cardiovascular disease, says a new meta-analysis.

Doses of at least 500 milligrams per day were necessary to produce these effects, which were accompanied by an 8.8 per cent reduction in triglyceride levels, according to the meta-analysis of 13 randomised, clinical trials published in the *Journal of Chiropractic Medicine*.

"Although the magnitude of change in LDL cholesterol and triglycerides appeared modest, it can be estimated [...] that an LDL cholesterol change of -7.9 mg/dL could potentially translate to a 6.6 per cent reduction in coronary heart disease and that a change in triglycerides of -20.1 mg/dL could translate to a 2.4 per cent reduction in coronary heart disease risk," wrote Marc McRae from National University of Health Sciences in Lombard, Illinois.

Heart disease causes almost 50 per cent of deaths in Europe, and is reported to cost the EU economy an estimated €169 billion (£116 billion) per year.

On the other hand, no significant increases were observed in HDL cholesterol levels, stated McRae.

"This last result is surprising because numerous epidemiologic studies have shown that vitamin C intake positively correlates with HDL cholesterol concentrations," he added.

Pooled data

McRae identified 13 trials that included 14 separate groups including 405 subjects with high cholesterol levels (hypercholesterolemia). The subjects received vitamin C supplements of at least 500 mg per day for a period of three to 24 weeks. The studies were either a crossover double blind design or placebo-controlled double-blind design.

The average age of the study participants was 58.9, and 60 per cent of the subjects were men.

The pooled effect of the supplements on LDL blood levels was a reduction of 7.9 mg per dL, while HDL blood levels increased by 1.1 mg per dL. This latter result was not statistically significant, however, noted McRae.

"Supplementation with at least 500 mg/d of vitamin C, for a minimum of four weeks, can result in a significant decrease in serum LDL cholesterol and triglyceride concentrations. However, there was a non-significant elevation of serum HDL cholesterol," he said.

Mechanism

Commenting on the potential mechanism of action, McRae noted that vitamin C may intercept reactive oxygen species (ROS). This would have knock-on benefits for the inhibition of oxidative modification of LDL.

"This protection preserves the ability of LDL to be recognized by LDL receptors in the liver and therefore expedite its removal from the blood by LDL cholesterol catabolic pathways," he stated.

Another possible mechanism is a protective effect on LDL receptors. Animal studies have reported that the number of LDL receptors may decrease by as much as 25 per cent on consumption of a diet containing insufficient vitamin C.

Atherosclerosis is a Vitamin C Deficiency Disease

Every year half a million people die from coronary heart disease. In a recent CNN article discussing a new study based on the data from the Framingham study concludes: The study **"reaffirms the notion that coronary heart disease is the 800-pound gorilla of disease in this country, now and for the foreseeable future,"** says cardiologist Dr. Stuart Seides. Heart attacks were virtually unknown before the turn of the century. Our diets, especially in "developed" countries have gone through dramatic changes in this period. There is a very real connection between this new disease and our new diets.

As we discuss, Vitamin C is required for tissue integrity. Tissues that are under constant stress are particularly vulnerable to degradation from C deficiency. This is certainly true of our arteries.

Shortly before his death at 93, Linus Pauling and Matthias Rath had completed work on the link between atherosclerosis and Vitamin C (please see the link in the side bar). They had concluded that chronic Vitamin C deficiency lead to a serious compromising of our arterial system. Our bodies respond to this situation with a healing process. Let me explain.

Imagine your arterial wall to be like a stone dam. This is a reasonable analogy since your cells are like the stones and the water being held by the dam is similar to the blood under pressure in our arteries. Now, if the cement between the rocks is inferior, leaks could occur. Likewise in our arteries, if the ground substance between our cells is inferior due to lack of the proper development of collagen and fibrils as a result of inadequate Vitamin C, the arterial wall may be susceptible to seepage.

When arteries are compromised, our systems produce a specialized, sticky form of low-density lipoprotein (yes, there is a link with cholesterol. Please read the side bar) called Lp(a) which attaches itself to the arterial wall to prevent blood seepage. This is consistent with where arterial plaque is found - where there are lesions and where there is particular stress (i.e. at branches, in arteries, not veins, due

to the pressure and in coronary arteries due to the stress of the constant motion).

A study, *Vitamin C Deficiency and Risk of Myocardial Infarction* (Heart Attack) was published in the March 1997 issue of the **British Medical Journal**. The Aceology Medical Review states this conclusion:

This study looked at the association between blood vitamin C concentration and risk of heart attack in 1605 men from eastern Finland who did not have evidence of coronary artery disease on exercise testing between 1984 and 1989.

Seventy of the men had a fatal or a non-fatal heart attack between 1984 and 1992. Among men with the vitamin C deficiency 13.2% had a heart attack compared to 3.8% in those who were not deficient in Vitamin C.

This study concludes that vitamin C deficiency may be a risk factor for coronary artery disease and heart attack.