High Levels of Vitamin C May Decrease Ischemic HD and Mortality Risks

Deborah Brauser | July 17, 2015

COPENHAGEN, DENMARK — Although findings that a healthy diet is good for the heart aren't really a surprise anymore, new research suggests that this may be because of the increase in vitamin-C levels that come from a high intake of fruit and vegetables[1].

Evaluation of almost 100,000 individuals from the Copenhagen General Population Study (CGPS) and Copenhagen City Heart Study showed that those who ate the most fruit and vegetables had a 13% lower risk of CVD and a 20% lower risk of all-cause mortality compared with the subgroup that ate these foods only rarely.

Additional analysis showed that genetically high levels of plasma vitamin-C concentrations were also linked to reduced risks, although "the 95% CI overlapped 1.0, which made certain statistical inferences difficult," write the researchers, led by Dr Camilla J Kobylecki (Copenhagen University Hospital, Denmark).

Still, "our data cannot exclude" that benefits from these healthy foods could, at least in part, be driven by high vitamin-C concentrations, they add.

The findings were published in the June 2015 issue of the *American Journal of Clinical Nutrition*.

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The investigators examined data for 87,030 participants in the CGPS and 10,173 participants in the Copenhagen City Heart Study, all of whom were white and had DNA samples available for assessment.

For this measure, the Mendelian randomization approach was chosen for use because it's "based on the assumption that the inheritance of a genetic variant from parents to offspring is independent of the environment; thus, genetic variants that either alter or are markers of alterations in plasma vitamin-C concentrations provide an ideal system to assess . . . lifelong high vitamin-C concentrations," write the researchers, adding that they genotyped for solute carrier family 23 member 1 (*SLC23A1*) rs33972313.

Vitamin-C levels were also measured in blood samples from 3512 of the CGPS study members.

In addition, 83,256 of the CGPS participants were split into the following four subgroups based on how often they ate fruit or vegetables: almost never (n=6369, 71% men), less than once a day (n=17,576, 59% men), once a day (n=28,517, 45% men), or at least twice a day (n=30,794, 31% men).

The subgroup with the highest intake of these foods had a significantly lower risk for ischemic heart disease vs the group with the lowest intake (adjusted hazard ratio [HR] 0.87, 95% CI 0.78–0.97, P=0.01), as well as an even lower risk for all-cause mortality (HR 0.80, 95% CI 0.73–0.88, P <0.001). Similar results were found regarding just fruit or just vegetable intake.

"We showed stepwise-higher plasma vitamin-C concentrations with higher fruit intake," report the investigators.

For "genetically determined 25% higher" vitamin-C levels, the odds ratio (OR) for ischemic heart disease was 0.90 (95% CI 0.75–1.08) and for all-cause mortality was 0.88 (95% CI 0.72–1.08).

The researchers note that because these foods are high in vitamins and minerals, antioxidants, and micronutrients, "it is plausible that one or a combination . . . might confer cardiovascular protection through an effect on vascular

function, a reduction of blood pressure, lower plasma concentrations of LDL cholesterol, or a reduction in oxidative stress.

"The latter effect could be mediated through vitamin C, which is abundantly present in fruit and vegetables and considered a powerful antioxidant," they add.

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References

1. Kobylecki CJ, Afzal S, Smith GD, Nordestgaard BG. Genetically high plasma vitamin C, intake of fruit and vegetables, and risk of ischemic heart disease and all-cause mortality: a Mendelian randomization study. *Am J Clin Nutr* 2015; 101:1135-1143. Abstract

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