

Low vitamin C levels may raise heart failure patients' risk

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Low levels of vitamin C were associated with higher levels of high sensitivity C-Reactive protein (hsCRP) and shorter intervals without major cardiac issues or death for heart failure patients, in research presented at the American Heart Association's Scientific Sessions 2011.

Compared to those with high [vitamin C](#) intake from food, [heart failure](#) patients in the study who had low vitamin C intake were 2.4 times more likely to have higher levels of hsCRP, a marker for inflammation and a risk factor for heart disease.

The study is the first to demonstrate that low vitamin C intake is associated with worse outcomes for heart failure patients.

[Study participants](#) with low vitamin C intake and hsCRP over 3 milligrams per liter (mg/L) were also nearly twice as likely to die from cardiovascular disease within one year of follow-up.

"We found that adequate intake of vitamin C was associated with longer survival in [patients with heart failure](#)," said Eun Kyeong Song, Ph.D., R.N., lead author of the study and assistant professor at the Department of Nursing, College of Medicine, in the University of Ulsan in Korea.

The average age among the 212 patients in the study was 61, and about one-third were women. Approximately 45 percent of the participants had moderate to severe heart failure.

Participants completed a four-day food diary verified by a registered dietitian and a software program calculated their vitamin C intake. Bloods tests measured hsCRP.

Researchers divided participants into one group with levels over 3 mg/L of hsCRP and another with lower levels. Patients were followed for one year to determine the length of time to their first visit to the [emergency department](#) due to cardiac problems or death.

Researchers found that 82 patients (39 percent) had inadequate vitamin C intake, according to criteria set by the Institute of Medicine. These criteria allowed the researchers to estimate the likelihood that the patient's diet was habitually deficient in vitamin C based on a four day food diary. After a year follow-up, 61 patients (29 percent) had cardiac events, which included an emergency department visit or hospitalization due to [cardiac problems](#), or cardiac death.

The researchers found that 98 patients (46 percent) had hsCRP over 3 mg/L, according to Song.

Inflammatory pathways in [heart failure patients](#) may be why vitamin C deficiency contributed to poor health outcomes, the data suggests.

"Increased levels of high-sensitivity C-reactive protein means a worsening of heart failure," Song said. "An adequate level of vitamin C is associated with lower levels of [high-sensitivity](#) C-reactive protein. This results in a longer cardiac event-free survival in patients."

The use of diuretics may also play a role because vitamin C is water soluble and diuretics increase the amount of water excreted from the kidneys, said Terry Lennie, Ph.D., R.N., study author and associate dean of Ph.D. studies in the College of Nursing at the University of Kentucky in Lexington, Kentucky.

"Diet is the best source of vitamin C," Lennie said. "Eating the recommended five servings of fruits and vegetables a day provides an adequate amount."

More randomized controlled trials and longitudinal prospective studies are needed to determine the impact of other micronutrients on survival or rehospitalization, Song said.

Provided by American Heart Association

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