

High-normal phosphate levels linked to early atherosclerosis

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Healthy adults with higher levels of phosphate in the blood are more likely to have increased levels of calcium in the coronary arteries—a key indicator of atherosclerosis and future cardiovascular disease risk, reports a study in the February 2009 issue of the *Journal of the American Society of Nephrology (JASN)*.

"Phosphate level may represent a previously unidentified and modifiable cardiovascular risk factor, and could help identify people for whom modifiable risk factors could be screened and managed," comments Robert N. Foley, MD, of University of Minnesota and the US Renal Data System (USRDS), both in Minneapolis, MN.

Dr. Foley and colleagues studied the relationship between phosphate levels and coronary artery calcium in 3,015 healthy young adults from a long-term study of risk factors for coronary artery disease. At an average age of 25 years, the subjects underwent measurement of their serum phosphate level. The phosphate level reflects the mineral phosphorus, which plays an important role in bone metabolism.

A special computed tomography (CT) scan was used 15 years later to measure the level of calcium in the coronary arteries. Coronary artery calcium is an early sign of atherosclerosis, or "hardening of the arteries."

After adjustment for other factors, blood phosphate levels at age 25 were significantly related to coronary artery calcium levels at age 40. Subjects with higher phosphate levels were about 50 percent more likely

to be at the highest level of coronary artery calcium, compared to those with lower phosphate levels. The relationship was strongest at higher phosphate levels—however, phosphate levels were within range of normal for nearly all of the young adults studied.

Patients with kidney disease have increased phosphate levels, which are associated with an increased risk of heart disease. If higher phosphate levels play a role in causing cardiovascular disease, then a link between phosphate level and early atherosclerosis might be found even in healthy people without kidney disease.

"Our findings indicate that phosphate levels in the normal range may be risk factors for coronary artery atherosclerosis," says Dr. Foley. "For physicians and patients, improved understanding of risk factors for heart disease and coronary artery disease provides more opportunity to screen for and modify them."

Another study in the same issue of *JASN* shows that higher phosphate levels are linked to increased coronary artery calcium in patients with moderate chronic kidney disease (CKD). The two studies raise the possibility that phosphate-lowering drugs—generally used only in patients with end-stage renal disease on dialysis—might help to reduce cardiovascular risk in CKD patients and even in healthy adults with high-normal phosphate levels.

Since the study was not experimental, it cannot establish any cause-and-effect relationship. In addition, it lacked data on some possibly relevant laboratory values—especially parathyroid hormone and vitamin D, which, like phosphate, have important effects on bone.

Source: American Society of Nephrology

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