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NEWS

RSNA Press Release

Coronary Artery Calcium Can Be a Warning Sign of Fatal Cardiac Event to Come

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At A Glance

- Over half of all first cardiac events are not preceded by symptoms.
- Coronary artery calcium buildup provides warning sign of potential fatal event.
- Mortality risk increases with calcium score.
- Individuals with a calcium score of over 1,000 are 12 times more likely to die within 5 years compared with individuals with a calcium score of 10 or below.

OAK BROOK, Ill. - The amount of calcium accumulated in the coronary arteries can help predict whether an individual with no symptoms of heart disease will suffer a fatal event within five years, according to a large, multi-center study appearing in the September issue of the journal *Radiology*.

"Our observational study of more than 10,000 patients over five years revealed that coronary artery calcium screening provides independent, incremental information over traditional risk factors in predicting death," said study co-author Paolo Raggi, M.D., professor of medicine at Tulane University School of Medicine and associate chief of cardiology at Tulane University Hospital and Clinics in New Orleans.

The study contributes important data to the debate on the use of coronary artery calcium screening to detect latent atherosclerosis, the leading cause of heart disease, in asymptomatic individuals. Atherosclerosis is a build up of cholesterol and other fatty substances, cellular waste products, calcium and other matter that contribute to the formation of what's commonly referred to as "plaque" in the inner lining of an artery. Plaque, which can grow large enough to significantly reduce blood flow through an artery, can also rupture, causing blood clots that can lead to heart attack or stroke.

"We know that atherosclerosis is a disease that infiltrates the arterial wall long before it obstructs blood flow and causes symptoms," Dr. Raggi said. "Over half of all first coronary heart disease events are sudden cardiac deaths or acute heart attacks in individuals who experienced no previous symptoms."

The traditional cardiac risk factors offer researchers good but limited ability to estimate risk for individual patients. To help prevent deaths, researchers are focusing on finding new tools that can help identify high-risk individuals. One such tool is coronary calcium screening.

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The researchers followed 10,377 asymptomatic individuals who were referred for a cardiac risk factor evaluation and coronary calcium screening with electron-beam computed tomography (EBCT) between 1996 and 2000. Each patient was considered to be at above-average risk of coronary disease, due to the presence of cardiac risk factors including advanced age, high blood pressure, high cholesterol, diabetes, current smoking or a family history of premature coronary disease. Participants ranged from age 30 to 85. Forty percent of the patients were women.

The average coronary calcium score for the 10,377 individuals was 133. Scores ranged on average from 12 to 1,070 for men and 7 to 291 for women. Approximately 57 percent of the total group had a score of 10 or less.

The study showed that survival at five years worsened substantially as the calcium scores increased from levels of 10 or less to greater than 1,000. Compared to individuals with a calcium score of 10 or less, the relative risk of mortality was 2.47 times greater for those with a score of 11 to 100, 3.55 times greater for those with a score of 101 to 400, 6.15 times greater for those with a calcium score of 401 to 1,000, and 12.29 times greater for those with a score higher than 1,000.

"It is not clear whether the presence of coronary calcium renders plaque unstable, but it does indicate an individual's predisposition to suffer acute coronary events, such as stroke and sudden death," Dr. Raggi said. "In fact, age and coronary calcium were the strongest risk markers in our patient population."

According to Dr. Raggi, the study's size and robust statistical methods definitively confirm the ability of coronary calcium screening to reveal evidence of coronary artery disease.

"The results of our study justify using coronary calcium screening to help calibrate the risk more accurately in patients considered to be at intermediate risk for heart disease," he said.

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"Prognostic Value of Cardiac Risk Factors and Coronary Artery Calcium Screening for All-Cause Mortality." Collaborating with Dr. Raggi on this paper were Leslee J. Shaw, Ph.D., from the Atlanta Cardiovascular Research Institute, Enrique Schisterman, Ph.D., and Daniel S. Berman, M.D., from Cedars-Sinai Medical Center in Los Angeles and Tracy Q. Callister, M.D., from EBT Research Foundation in Nashville, Tenn.

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