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NEWS

RSNA Press Release

Fat Around Heart May Be Early Indicator of Coronary Disease

Released: August 16, 2011

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At A Glance

- Fat around the heart (pericardial fat) can be a signal of coronary disease before symptoms appear.
- MRI can noninvasively assess coronary plaque burden.
- Pericardial fat is more strongly related to coronary plaque eccentricity than BMI or waist circumference.
- Heart disease is the leading cause of death in the U.S.

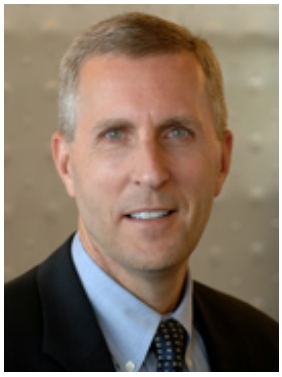
OAK BROOK, Ill. — Researchers have found more evidence supporting the role of fat around the heart in promoting atherosclerosis, according to a study published online in the journal *Radiology*.

New results from the Multi-Ethnic Study of Atherosclerosis (MESA) show that pericardial fat is more strongly related to coronary artery plaque than either body mass index (BMI) or waist circumference.

When plaque forms in the arteries, it deposits in an irregular manner, causing thickening of the artery wall on one side, but not the other. The ratio of the thick side to the thin side is referred to as plaque eccentricity and is a strong indicator of heart disease.

According to the American Heart Association, heart disease is the leading cause of death in the U.S. In 2010, an estimated 785,000 Americans had a new heart attack, and about 470,000 had a recurrent attack. Every 60 seconds, one person in the U.S. dies from a heart attack.

While previous studies have looked at the relationship of pericardial fat to atherosclerosis in patients with severe coronary disease, this is the first study to determine the association of pericardial fat on coronary artery plaque burden in asymptomatic individuals.


David A. Bluemke, M.D., Ph.D.

"The individuals in this study had no symptoms and were otherwise healthy," said senior author David A. Bluemke, M.D., Ph.D., director of Radiology and Imaging Sciences at the National Institutes of Health (NIH) Clinical Care. "They did not have significant coronary artery narrowing. Yet, despite this, they had coronary plaque that could be detected by MRI."

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For the study, 183 individuals without clinical cardiovascular disease were recruited from the Baltimore and Chicago field centers of MESA, a study funded by the NIH. Participants included 89 women and 94 men with a mean age of 61 years.

"The individuals were fairly representative of the U.S. population, although the majority were overweight," Dr. Bluemke said.

The researchers used magnetic resonance imaging (MRI) to measure coronary artery eccentricity (ratio of maximal to minimal artery wall thickness) as a measure of early-stage atherosclerosis and computed tomography (CT) to determine pericardial fat volume.

"Pericardial fat is located behind the sternum, around the heart, and we cannot see it except with CT or MRI," Dr. Bluemke said. "In some people, extra fat forms preferentially in this area. We do not know why. However, extra fat around the heart is generally associated with being overweight or obese."

The results showed that pericardial fat volume correlated significantly with the degree of plaque eccentricity in both men and women. After adjustment for BMI, waist circumference, traditional risk factors, C-reactive protein level and coronary calcium content, the relationship between pericardial fat and plaque eccentricity remained significant in men, but not in women.

"The findings indicate yet another reason that obesity is bad for us," Dr. Bluemke said. "It is particularly bad when the fat forms around the heart, since the heart fat appears to further promote coronary artery plaque."

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"The Association of Pericardial Fat with Coronary Artery Plaque Index at MR Imaging: The Multi-Ethnic Study of Atherosclerosis (MESA)." Collaborating with Dr. Bluemke on this paper were Cuilian Miao, M.D., Shaoguang Chen, M.S., Jingzhong Ding, M.D., Kiang Liu, Ph.D., Debiao Li, Ph.D., Robson Macedo, M.D., Shenghan Lai, M.D., Jens Vogel-Claussen, M.D., Elizabeth R. Brown, Sc.D., and João A. C. Lima, M.D.

Radiology is edited by Herbert Y. Kressel, M.D., Harvard Medical School, Boston, Mass., and owned and published by the Radiological Society of North America, Inc. (*http://radiology.rsna.org/*)

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