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NEWS

RSNA Press Release

Ultrasound Used to Predict Heart Attack Risk

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At A Glance

- Repeat ultrasound exams could help identify asymptomatic patients at risk for serious cardiac events.
- Carotid plaque build-up that appears dark on ultrasound and has a low gray scale median (GSM) level is unstable and may rupture or burst.
- In the study, patients with a reduction in GSM levels from their baseline ultrasound to the follow-up ultrasound exhibited a significantly increased risk for cardiac event compared to patients with increasing GSM levels.

OAK BROOK, Ill. — Repeat exams using widely available and inexpensive ultrasound imaging could help identify patients at high risk for a heart attack or other adverse cardiovascular events, according to a study published in the September issue of the journal *Radiology*.

Researchers performed ultrasound imaging on the carotid arteries of 1,268 patients who were asymptomatic but at high risk for cardiovascular disease. Of those, ultrasound determined that 574 patients had carotid artery disease, as determined by the amount of plaque built up in the two vessels that supply blood to the head and neck. Each of those patients had a second ultrasound exam six to nine months later to measure changes in the plaque lining the arteries.

"Determining the degree of stenosis, or how much the artery has narrowed, is insufficient to predict patient risk," said lead researcher Markus Reiter, M.D., from the Department of Angiography and Interventional Radiology at Medical University Vienna in Austria. "We know that the majority of cardiovascular and cerebrovascular events occur in patients whose blood vessels are less than 70 percent narrowed."

Reiter and his team used ultrasound images and computer-assisted gray scale median (GSM) measurements to determine the density of the plaque lining the carotid arteries. Plaques that appear dark on ultrasound images and have a low GSM level are suggested to be associated with an increased risk for clinical complications and seem to represent unstable plaques, which are more likely to rupture or burst.

The study's follow-up ultrasounds revealed that GSM levels had decreased in 230 (40 percent) of the patients. Of those, 85 (37 percent) experienced a major adverse cardiovascular event within three years of the second ultrasound. Examples of these events include heart attack, stroke, coronary artery bypass, surgery or other intervention.

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In 344 (60 percent) of the patients, ultrasound GSM levels had increased between the baseline and follow-up ultrasound examinations. Of those patients, 92 (28 percent) experienced a major adverse cardiovascular event.

"Patients with a reduction in GSM levels from their baseline ultrasound to the follow-up ultrasound exhibited a significantly increased risk for near-future adverse event compared to patients with increasing GSM levels," said Dr. Reiter.

It is important to note that the results showed that vulnerable plaque in the carotid artery was not only an indicator of increased risk of stroke downstream from the carotid artery, but also was associated with disease progression elsewhere in the cardiovascular system.

Although additional studies are needed, Dr. Reiter said measuring GSM levels on serial ultrasound examinations may be a noninvasive way to identify the presence of vulnerable plaques and improve the effectiveness of therapeutic strategies.

"This technique will give us additional information to use in selecting patients that need aggressive treatment," he said.

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"Increasing Carotid Plaque Echolucency Predicts Cardiovascular Events in High Risk Patients." Collaborating with Dr. Reiter were Isabella Effenberger, M.D., Schila Sabeti, M.D., Wolfgang Mlekusch, M.D., Oliver Schlager, M.D., Petra Dick, M.D., Stefan Puchner, M.D., Jasmin Amighi, M.D., Robert A. Bucek, M.D., Erich Minar, M.D., and Martin Schillinger, M.D. Journal attribution requested.

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