New clinical method could lower risk of recurring heart attacks

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Researchers at Lund University in Sweden can now show that a new examination method identifies high-risk plaques in the blood vessels surrounding the heart, that cannot be seen solely with traditional angiograms. This type of plaque, rich in fat, could potentially cause recurring heart attacks in patients with heart disease. The study is published in the *The Lancet*.

"We have been working on this study for ten years. This creates a unique opportunity to treat plaques before they cause a heart attack," says David Erlinge, professor of cardiology at Lund University and Consultant in Interventional Cardiology at Skåne University Hospital, who together with researchers in New York led the study.

The results show that over fourteen percent of the treated patients had some form of heart disease recurrence within four years. In eight percent of the cases, the cause was high-risk plaque that was not detected in a previous angiogram.

Several autopsy studies have previously shown that vulnerable plaques are the underlying cause of most coronary heart disease. When a plaque ruptures and forms one or more clots, they cause the majority of heart attacks and infarction-related sudden death.

"This a major step forward for cardiology," said co-author James Muller, MD, of the Division of Cardiovascular Medicine at Brigham and Women's Hospital in Boston, Mass. "This study has demonstrated a superior way to quantify risk at the plaque level and to identify patients who are at increased risk of experiencing adverse cardiac events."

The new method, known as NIRS (Near-Infrared Spectroscopy) and IVUS (Intravascular Ultrasound), uses infrared light and ultrasound. The examination of the patient is typically performed with a catheter brought to the heart area via the wrist, and done in connection with an angiogram. The high-fat plaques can then be seen in yellow on a color-coded map.

"An angiogram only reveals a shadow of the vessel walls, not what is in the wall. With the new NIRS-IVUS method, we can see vulnerable plaque there, as well," says David Erlinge.

The study included 898 patients from 16 hospitals in Sweden, Denmark and Norway. All had suffered a heart attack and were treated with balloon dilation and stents in the coronary arteries. 14.4 percent of the patients in the study experienced new issues within four years of the heart attack. In 8 percent of the patients, the direct cause was untreated plaque. A total of 3,629 untreated plaques were found, which is an average of about four per treated patient.

"The study shows that most of the subsequent cardiac events were caused by plaque not revealed in previous examinations using angiograms and physiological pressure measurements, which are the methods used clinically today," says David

Erlinge.

The next big question is how to treat these plaques. The researchers included a small treatment study that showed that stenting of dangerous plaques opened up the vessel and halved the number of cardiac events. This needs to be confirmed by larger studies, however.

More information: David Erlinge et al. Identification of vulnerable plaques and patients by intracoronary near-infrared spectroscopy and ultrasound (PROSPECT II): a prospective natural history study, *The Lancet* (2021). DOI: 10.1016/S0140-6736(21)00249-X

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