

CT angiography appears better at predicting future risk for patients with chest pain

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An analysis of diagnostic test results from the Prospective Multicenter Imaging Study for Evaluation of Chest Pain (PROMISE) trial - in which patients with stable chest pain were randomized to either anatomic or functional testing as an initial diagnostic strategy - showed that the presence and extent of coronary artery disease detected by CT angiography better predicted the risk for future cardiac events than did measures of exercise tolerance or restricted blood flow to the heart muscle. The superiority of CT angiography primarily depended on its ability to reveal nonobstructive coronary artery disease. The report by a team led by Udo Hoffmann, MD, MPH, of the Massachusetts General Hospital (MGH) appears in the June 13 issue of *Circulation*.

"We do show that obstructive [coronary artery disease](#) and myocardial ischemia remain the strongest predictors of future cardiovascular events, but for the first time, in a randomized comparison we demonstrate the ability of CT angiography (CTA) to identify a large group of at-risk patients who would have been missed by functional stress testing," says Hoffmann, who is director of the MGH Cardiac MR PET CT Program. "This not only provides important information for physicians making choices regarding which test to perform but also suggests that implementing lifestyle changes and potentially the use of statin drugs may lower the risk of future clinical events for patients with nonobstructive disease."

The PROMISE trial was conducted at 193 centers across North America to determine whether a care strategy starting with coronary CTA, which

reveals the structure of blood vessels supplying the heart, or a strategy starting with functional testing, measures such as stress testing or echocardiography that reflect how well the heart muscle is working, provided better guidance for clinical decisions regarding patients with chest pain. Those results, reported in a 2015 New England Journal paper, found similar outcomes for both strategies in terms of the incidence of future cardiovascular events.

The current study directly analyzed associations between the results of all diagnostic tests and the risk of future cardiac events in around 9,100 of the more than 10,000 patients in the PROMISE trial. The most important result indicated that the ability of coronary CTA to identify nonobstructive coronary artery disease - a less-than-70-percent narrowing of a coronary artery - identifies an at-risk group of patients not found by functional testing. In fact, most of the cardiovascular events during the study's two-year follow-up period occurred in patients not initially diagnosed with coronary artery obstruction. While functional testing on its own was inferior to CTA, combining the results of functional testing with traditional cardiovascular risk factors - such as cholesterol levels, blood pressure and smoking status - significantly improved its prognostic value.

"While these observational data cannot prove that treating patients based on the results of CTA testing will automatically result in better health outcomes, they do provide new information enabling a more informed choice of testing for patients with stable chest pain, especially for predicting future cardiovascular risk." says Hoffmann, who is a professor of Radiology at Harvard Medical School. "Future studies also need to determine whether more detailed analysis of exercise parameters in functional testing could improve its prognostic ability; but it's reassuring that both strategies can provide important prognostic information for patients and their physicians."

More information: Udo Hoffmann et al, Prognostic Value of Noninvasive Cardiovascular Testing in Patients With Stable Chest PainClinical Perspective, *Circulation* (2017). [DOI: 10.1161/CIRCULATIONAHA.116.024360](#)

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