

## Tests to diagnose coronary artery disease come with similar costs

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A new type of CT scan initially costs slightly less than the traditional stress test to diagnose blocked coronary arteries in patients with chest pain, but its lower cost did not translate into medical care savings over time, according to an analysis by Duke Medicine researchers.

The team will present their economic analysis of coronary computed tomographic angiography (CTA) and conventional functional stress tests Sunday, March 15, at the annual meeting of the American College of Cardiology (ACC).

A study presented today by another Duke researcher found that CTA and stress testing had statistically equal patient outcomes, although CTA exposed patients to less radiation relative to some of the alternatives.

"Together, these presentations reveal a truer picture of the value of CT angiography: not significantly better than functional testing at saving lives or reducing complications for [heart](#) artery blockage, but also not significantly worse, and with comparable costs out to three years," said Daniel Mark, M.D., professor of medicine in the Duke Clinical Research Institute (DCRI) and the Duke Heart Center, and lead author of the financial analysis.

More than 4 million people a year in the United States develop symptoms of chest pain that could be heart-related, and cardiologists have long sought a noninvasive way to see inside the arteries of these patients to determine whether they have life-threatening coronary

blockage.

For the past 60 years, the primary way to get such information has been invasive angiography—heart catheterization. The benefits of catheterization include the ability to see severe heart artery blockage that requires either surgery or stenting. But many patients are given this test and found not to have any blockage of consequence, or blockage that could be treated with medications.

The most common way that doctors now decide whether to do a heart catheterization in a patient with [chest pain](#) is to first perform a [stress test](#), typically taking pictures of the heart muscle and its blood flow patterns under stress, usually with ultrasound or with radioactive tracers. The stress test provides what is called "functional" information, quite different from the anatomic information available from both invasive and CT coronary pictures. However, functional testing does not show the heart arteries directly and does not allow doctors to decide if stenting or bypass is needed.

Over the past 15 years, researchers and engineers have developed an additional test, using CT scanners to take pictures of the heart arteries without anything more invasive than an intravenous injection of X-ray contrast. These have produced pictures that are approaching the quality of those seen with invasive angiography.

CT coronary angiography has therefore been greeted by some heart specialists as a breakthrough test, allowing the inside of the heart arteries to be seen clearly with much lower risk.

What has not been clear before now is whether skipping the functional testing and going directly to CT angiography would provide patient outcomes that are better, worse or the same as using a functional test and basing the decision to use invasive catheterization upon finding stress

induced abnormalities.

The results of the PROMISE study provide those answers.

The main findings from the study, presented at the ACC meeting and published in *The New England Journal of Medicine*, found no statistical difference between the two diagnostic tests on the risk of serious events such as heart attacks, hospitalizations, unstable angina or death.

Costs of the test were also quite similar. CTA compared with a stress test and echocardiogram was only about \$100 less, and about \$542 less than an exercise stress test using a nuclear dye to see heart blood flow patterns.

But the CTA testing strategy resulted in a trend for additional costs during the first 90 days after testing, driven mainly by the use of more procedures to unblock arteries and despite reduced use of additional noninvasive testing. That additional amount (\$279) was not statistically significant, the researchers reported.

"Despite some fair differences in the prices of these diagnostic tests, there was not a statistical difference between the costs over three years of follow-up," Mark said. "Prior to this, there were no reliable clinical trial data, so these data provide tremendous value when viewed from the perspective of how little was known in 2009, when PROMISE was funded by the National Heart Lung and Blood Institute to settle this question.

"Coronary CT angiography may not be quite the hoped-for holy grail of cardiology, but its more liberal use following the standards set in PROMISE will not hurt patients and will not cause a major additional cost burden on the health care system. That is extremely important information to have," Mark said.

Provided by Duke University

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