

No real cost difference between types of tests that look for heart disease

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A study comparing the overall economics of computed tomographic angiography with functional stress tests for evaluating patients with symptoms suggestive of possible blocked coronary arteries found no significant differences in costs over three years. The study was presented at the American College of Cardiology's 64th Annual Scientific Session.

Although the angiography, scans of the heart referred to as CT angiography, initially appeared to provide some cost savings, this didn't hold up once the costs of subsequent testing and procedures to open blocked arteries were also considered.

This economic substudy of the PROspective Multicenter Imaging Study for Evaluation of chest pain (PROMISE) trial compared the costs for CT angiography with functional stress testing—an exercise electrocardiogram, stress echocardiography or nuclear [stress test](#)—that were used to check for signs of cardiovascular disease in 10,003 patients presenting with chest pain. The clinical results, also reported at the ACC Scientific Session, showed that regardless of which testing strategy was used, patients had no significant differences in the rate of death, heart attack, major procedural complications or hospitalizations for chest pain after more than two years of follow up. The differences in costs associated with the two tests were also minimal.

"Despite some fair differences in the prices of these different diagnostic tests, there was no statistically significant difference between the cost of first receiving an anatomic CT angiography versus a functional stress test

in these patients over three years of follow-up," said Daniel Mark, M.D., professor of medicine in the Duke Clinical Research Institute and the Duke Heart Center and the study's lead author. "Prior to this there was really no data that were reliable or empirically based, so this information provides tremendous value, even if the answer is that there is not much difference between the two tests. It's an answer and a useful answer that can help drive decision making."

Researchers determined the average cost of each test and also collected billing data on subsequent testing and treatments throughout the trial. The relative cost of these tests looked different on the front end. The heart CT scans cost \$404 on average, which was about \$110 less than stress echocardiogram and \$542 less than nuclear exercise stress testing; stress ECG was the least expensive at \$174 on average. But the CTA testing strategy resulted in 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.

"The net cost during the first 90 days after testing was \$280 higher on average with CT angiography," said Mark, who stressed that the number of revascularizations is still very low compared to those seen in other population studies. "Again, these differences in cost are not statistically significant and the surgeries may well have improved the survival of the people who received them - there were too few such procedures to see an effect on the overall survival rates in the study. Still, when you look at things like cost, which has one foot in the clinical arena and one foot in the health policy arena, standard criteria for statistical significance may not be the best benchmark of what is important, and it becomes a complex discussion."

Each year, more than 4 million Americans suffer with new onset [chest pain](#) and undergo different tests to determine whether they have evidence of [coronary artery disease](#). CT angiography gives doctors a

noninvasive way to see inside the heart and patients an alternative to invasive angiography for determining if they have heart disease. Mark said the economic study also provides important information for patients, who are more routinely asking how much these different tests cost and if a more expensive test is worth the money.

In the first 90 days after initial testing, the average cost overall was \$2,534 for patients receiving CT angiography compared to \$2,255 for those getting functional testing—a \$279 difference; the cost difference was considerably lower in year two, at just \$30. There was a small bump in costs in the CT angiography group in year three, but this was due to some expensive non-cardiac care, according to Mark.

"I don't think this is going to cause any huge shifts in practice," said Mark. "It might be that some physicians who were holding back on using CT angiography because it hadn't proven itself in the big leagues compared to decades of use with functional stress tests, might interpret our findings as being reassuring that this actually provides good information, there may be less radiation compared to nuclear tests and for not much more cost."

But financial concerns are only one part of a complex equation, according to Mark. PROMISE researchers will further analyze the data, and plan to evaluate whether different testing strategies and subsequent clinical outcomes are associated with better quality of life or patient satisfaction to fully assess the value of each.

"This was a huge research effort and we've only just begun to dig into the data," Mark said. For now, he said clinicians can feel reassured by the fact that both testing approaches have similar clinical outcomes and costs.

Cost-effectiveness analyses, which would have looked at the added cost

for added benefit, were not performed because clinical outcomes were the same regardless of which test was initially ordered. This research is limited in that it relies on a best estimate of costs and cannot account for all of the resources used; nor did it factor in related medication costs. In addition, authors noted significant deviations in testing costs across centers that might alter the relative [costs](#) of the two strategies.

PROMISE included a total of 10,003 patients who visited 193 health centers in the United States and Canada. Participants had no prior diagnosis of coronary artery disease but had new symptoms that made physicians suspect they might have heart disease. Nearly all had at least one cardiovascular risk factor such as high blood pressure, diabetes or a history of smoking.

Half of the patients in this study were randomly selected to receive CT angiography, which generates 3-D images of the heart's arteries that doctors can use to assess the degree of narrowing. The remainder received one of three functional tests that are used to track the heart's response to stress using electrical signals, sound waves or nuclear imaging. All of these tests have been in common use for a decade or more, but they have never before been compared head-to-head in a large randomized trial.

Provided by American College of Cardiology

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