# CTA Cheaper for Screening of Coronary Disease

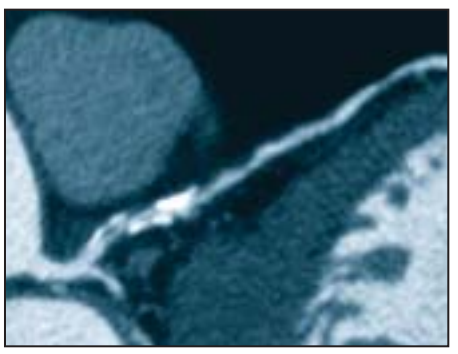
BY KERRI WACHTER
*Senior Writer*

WASHINGTON — Coronary CT angiography appears to be a less expensive alternative to myocardial perfusion SPECT imaging as an initial diagnostic screen for coronary artery disease, according to an analysis of data from two large regional health plans presented at the annual meeting of the Society of Cardiovascular Computed Tomography.

The average 12-month downstream coronary artery disease–related cost for patients who underwent coronary CT angiography (CTA) as an initial screen for CAD was $1,716 lower per patient than for those who underwent SPECT, said Dr. James K. Min of Cornell University, New York. The average cost of a nuclear study ranged from $3,000 to $4,000.

"CT [angiography] may be a potential, cost-efficient alternative to SPECT for the initial evaluation of patients with suspected coronary artery disease," said Dr. Min.

The researchers analyzed private payer data from two large regional health plans with more than 6.5 million members from 2002 to 2005. The database included membership information, pharmacy claims, and inpatient and outpatient service claims. The researchers identified patients who underwent CTA or MP SPECT imaging as an initial diagnostic screen for CAD. Information was collected for 1 year prior to and 1 year after the test.



**CTA reveals severe, diffuse, mixed plaque in the left anterior descending artery.**

Only patients without known CAD were included. These were patients who did not have any CAD-related procedure codes for the previous 12 months. CTA and MP SPECT claims included only those with coronary heart disease codes.

For each patient, the researchers calculated a cardiac risk score. The score was a weighted average of several risk factors, including use of digitalis, anticoagulants, antiplatelets, ACE inhibitors, β-blockers, antihypertensive medication, and antidiabetic medications, as well as other clinical cardiac conditions. The researchers also assessed each patient's overall health status using the Charleston Comorbidity Index.

PHOTOS COURTESY DR. JAMES K. MIN

**Multidetector CT volume rendered image shows calcification in the LAD and RCA.**

Each patient in the CTA group was matched with four patients in the SPECT group based on age, sex, and cardiac risk score. Both groups had an average age of 51 years. About two-thirds of the patients in each group (68%) were women. The average cardiac risk score was 0.20 in the CTA group and 0.19 in the SPECT group.

A total of 1,833 patients were identified who had an initial diagnostic screen with CTA; they were matched with 7,332 patients who had SPECT imaging.

In addition to a cost difference for the two modalities, the researchers noted that the use of antiplatelet therapy was greater among SPECT patients after the initial diagnostic test. There was also a trend toward greater use of ACE inhibitors and statins in the SPECT group, though this did not achieve significance.

"In terms of follow-up diagnostic tests, patients who initially underwent CT angiography were more likely to undergo nuclear stress testing in the follow-up period, while patients who underwent nuclear stress testing were more likely to undergo invasive coronary angiography," said Dr. Min. Looking at any diagnostic test, there was an 18% relative risk reduction in patients who underwent initial coronary evaluation with CT angiography.

The researchers also looked at clinical outcomes. Patients who underwent initial SPECT imaging had a higher rate of surgical or percutaneous interventions in the follow-up period compared with those who had CTA—1.2% compared with 0.4%, respectively. "CTA patients experienced lower rates of both hospitalization as well as angina or myocardial infarction," said Dr. Min, who disclosed that he receives research support from GE Healthcare.

"From this we tentatively conclude that compared to MP SPECT patients, patients who underwent CT as an initial diagnostic test incurred lower 12-month total coronary disease-related costs," he said. ■

# Suspicion of Pulmonary Embolism in Chest Pain Tips Scale to Triple Rule Out

BY KERRI WACHTER
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WASHINGTON — Whether to use a cardiac-focused CT protocol or a triple rule-out approach for assessing acute chest pain in the emergency department depends to some degree on what your clinical suspicions are, said Dr. Charles S. White at the annual meeting of the Society of Cardiovascular Computed Tomography.

"The question here is: Do you want to focus just on the coronaries, or do you want to expand the search and look for those 85% of other causes … that we might be able to detect with the triple rule out?" said Dr. White, chief of thoracic radiology at the University of Maryland Medical Center in Baltimore.

In the cardiac-focused CT approach, the field of view is limited to the area of the coronary arteries and therefore offers better spatial resolution of these vessels than the triple rule-out approach. This approach takes about 8 seconds on average and uses less radiation and contrast. The scanning direction is craniocaudal.

With the triple rule-out approach, the intent is to image the entire thorax, allowing visualization not only of the coronary arteries but the aorta and the pulmonary arteries. This approach allows evaluation for coronary artery disease, pulmonary embolism, and aortic dissection—earning it the triple rule-out moniker.

The trade-off for this expanded field of view is decreased spatial resolution, compared with the cardiac-focused approach. This approach involves a longer scan time (15 seconds) and involves greater radiation doses and more contrast than the cardiac-focused approach does. To minimize the chance of motion defects associated with a longer scan time, the scan is performed caudocranially. Motion is not as great a concern in the upper thorax, which is imaged last.

"The bottom line, I think, in terms of protocol between cardiac and triple rule out is that it depends on your level or suspicion that the cause of chest pain might be pulmonary embolism," said Dr. White. "When you have some level of suspicion of a pulmonary embolism, a triple rule-out study may be appropriate. If you don't, then a dedicated CT [angiography] would be the way to go."

In the University of Maryland Medical Center's ED, "We are generally still doing triple rule-out protocols," said Dr. White. Cardiac-only studies can be ordered by emergency physicians as well. However, in their experience, most triple rule-out patients (75%) have calcium scores of zero or close to it. Roughly 15% have significant stenosis.

There are a number of challenges associated with using the triple rule-out protocol. Getting patient cooperation can be difficult. When using 64-slice CT, however, it's not crucial to get the heart rate down below 90 beats per minute. "As long as it's a stable heart rate, a 64-slice scanner will generally get you fairly good images," said Dr. White.

Cost also is an issue with the triple rule-out approach, as is the greater radiation dose. The amount of technical labor required also is a concern. The ideal option is to have an in-house service to read the images on a 24-hour, 7-day a week basis.

However, industry is increasingly offering options to allow for off-hour coverage, such as the ability of radiologists and cardiologists to do preliminary reviews of images wherever they are.

"The bottom line is that about 50% of studies are negative. Off-hours, those patients are fairly easy to read … and you can probably send them home," said Dr. White. The images of the remaining patients are evaluated further the next morning.

Dr. White disclosed that he has received research support from Phillips Medical Systems. ■

# *Medicare to Cover Doppler Monitoring in ICUs*

The Centers for Medicare and Medicaid Services is amending its diagnostic ultrasound policy to allow coverage of Doppler monitoring of cardiac output in ventilated patients in intensive care and operative patients with a need for intraoperative fluid optimization.

The agency said that new studies had come to light that led it to reverse its previous decision against national coverage of the monitoring.

"As we developed this decision, we used the best available medical evidence—in the form of randomized controlled clinical trials—to reevaluate our position on this important noninvasive method of caring for patients in intensive care situations," CMS Acting Administrator Leslie V. Norwalk said in a statement.

Deltex Medical Group PLC, the Chichester, England–based company that makes the monitoring equipment, petitioned CMS last year to revisit its coverage decision. According to Deltex, the earlier CMS decision was made before its device, the CardioQ, was commercially available. The CardioQ was approved by the Food and Drug Administration under the 510(k) process in 2003.

CMS agreed with Deltex that there was now sufficient evidence to support coverage. The agency found a number of prospective, randomized studies showing that when compared with standard cardiac output (CO) monitoring, patients managed with the less invasive esophageal Doppler monitoring "had adequate CO, shorter hospital length of stays … and, generally, decreased complications."

The CardioQ system uses a disposable ultrasound probe inserted into the patient's esophagus. It determines circulating blood volume, a crucial measure during surgery or for ventilated patients in the ICU. The measure is used to guide intravenous fluid replacement and drug therapy.

**—Alicia Ault**