Expand CVD Testing to Close the Detection Gap

Target for testing populations such as the high-risk elderly, the functionally impaired, and diabetics.

BY DOUG BRUNK
San Diego Bureau

SAN DIEGO — Consider expanding subclinical cardiovascular disease testing to include asymptomatic high-risk patient populations, Leslie J. Shaw, Ph.D., advised attendees at the annual meeting of the American Society of Nuclear Cardiology.

Referring physicians should ask themselves: In which of my appropriate patients can I identify risk of cardiovascular disease, suggested Dr. Shaw, professor of medicine at Emory University, Atlanta. "The goal is to expand cardiovascular testing to improve the detection gap. But we have to do it appropriately, without excessive cost."

One ideal population to target with subclinical testing is the high-risk elderly. A study found that 1 in 5 people aged 65 years and older has an ankle brachial index of less than 0.9, yet only 1 in 10 peripheral artery disease patients will have classical symptoms of intermittent claudication (Atherosclerosis 2004;172:95-105). "If one relies solely on classical symptoms of intermittent claudication, you will underappreciate the prevalence of peripheral artery disease," said Dr. Shaw, who is also an outcomes research scientist for the Emory Program in Cardiovascular Outcomes Research and Epidemiology. "So in this population of patients, perhaps ankle brachial index or some other modality may be good at identifying asymptomatic patients who are at risk of worsening outcome."

Other populations to target include:

▶ **High-risk functionally impaired patients.** Patients who can't achieve 5 METs on the treadmill test "are functionally impaired and have a high risk for cardiovascular events," she said. "We need to do a better job of not only identifying the degrees of comorbidity, but treating their comorbidities, perhaps getting them to improve their exercise abilities to lessen that risk. There [are] a lot of data showing that these patients can improve their exercise tolerance and can have an improved outcome following cardiac rehabilitation."

▶ **High-risk smokers.** Smoking is a leading cause of acute coronary thrombosis. Dr. Shaw and her associates showed in a study that patients who smoke and have coronary calcification have a worsening mortality, compared with nonsmokers (Eur. Heart J. 2006;27:968-75). "Young smokers with a lot of coronary calcification have an anticipated loss in life expectancy of 4-5 years," she said. "This is a good message for young smokers, especially patients in their 40s who have children. Five years is a lot to lose of your life."

▶ **Asymptomatic diabetics.** Diabetes patients who are candidates for subclinical cardiovascular disease testing include those with poorly controlled diabetes, those who have not achieved their LDL cholesterol goal, those with multiple cardiac risk factors, and those who have had diabetes for more than 5 years.

In this population of patients, "you might want to think about assessing the baseline cardiovascular risk, consider ischemia testing in those with a high-risk scan, and look for disease progression downstream," Dr. Shaw said. She called coronary calcification "an amazing prognostic test." The overall rate of perfusion abnormalities is high in diabetic patients with a calcium score of 100 or higher.

▶ **Patients with metabolic syndrome.** The National Cholesterol Education Panel Adult Treatment Panel III defines the criteria for metabolic syndrome as three or more of the following: abdominal obesity (a waistline greater than 102 cm in men and greater than 88 cm in women); triglyceride levels of 150 mg/dL or greater; HDL cholesterol levels of less than 40 mg/dL in men and less than 50 mg/dL in women; a systolic blood pressure of 130 mm Hg or greater or a diastolic blood pressure of 85 mm Hg or greater; and a fasting glucose level of 110 mg/dL or greater.

A recent study showed that the prevalence of inducible ischemia is increased among patients with metabolic syndrome who do not have diabetes, as well as in those who have diabetes, when their calcium scores exceed 100 (Diabetes Care 2005;28:1445-50).

In these patients, "think about retesting with perfusion imaging," Dr. Shaw advised.

▶ **High-risk women.** This includes those with early menopause, those with autoimmune disease, and those with polycystic ovary syndrome. All conditions confer an increased risk of coronary artery disease.

Dr. Shaw stressed that by targeting high-risk patient populations, you are testing, not screening. "In discussions with payers, tell them you are trying to identify appropriate testing candidates and minimize inappropriate testing in your testing practice."

"The goal is to identify patients who require more intensive management and thereby decrease the detection gap of high-risk patients with a resulting … improvement in cardiovascular mortality." ■

Accuracy of Noninvasive CT Angiography Supported by Trial

BY PATRICE WENDLING
Chicago Bureau

CHICAGO — A second multicenter trial has shown that noninvasive CT angiography is highly accurate in assessing coronary artery disease when compared with conventional invasive angiography.

The per-vessel negative predictive value of 64-slice coronary CT angiography (CCTA) was 97% for identifying blockages greater than 50%, and 99% for blockages greater than 70%, when measured in 232 patients with typical or atypical chest pain in the Assessment by Coronary Computed Tomographic Angiography of Individuals Undergoing Invasive Coronary Angiography (ACCURACY) trial. Positive predictive values were 51% and 33%, respectively, Dr. James K. Min and his associates reported at the annual meeting of the Radiological Society of North America.

"The ACCURACY results [obtained] in a prospective, multicenter fashion definitively establish the high diagnostic accuracy and high negative predictive value of 64-detector-row CT angiography in chest pain patients with intermediate prevalence of coronary artery disease," said Dr. Min, director of the cardiac CT laboratory at New York–Presbyterian Hospital, New York City.

The findings echo those of the recent Coronary Artery Evaluation Using 64-Row Multidetector Computed Tomography Angiography (CORE-64) trial, in which CT angiography had a 91% positive predictive value and an 83% negative predictive value for identifying significant coronary artery stenoses. CORE-64 was the first large, multicenter trial of the 64-slice technology for coronary angiography, but was criticized by some attendees at the annual scientific sessions of the American Heart Association where it was presented. Concerns were raised that the radiation dose from repeated CT scans could pose a potential cancer risk. No such concerns were raised at the radiology meeting.

To reduce the amount of radiation given to patients in the ACCURACY trial, investigators used a radiation-dose reduction algorithm called EKG modulation that reduces CT angiography radiation by about 40%, Dr. Min said in an interview. The radiation dose per patient was about 10-15 millisieverts (mSv), which is about twice that of an invasive coronary angiogram and about half that of a noninvasive thallium stress test.

Since the trial began, a new algorithm called perspective axial gating has been commercially released and is reported to reduce exposure by 90%, to about 2-4 mSv. Both algorithms work by activating the CT scanner during select parts of the cardiac cycle only, Dr. Min said. For comparison, New York City residents are

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exposed to about 3 mSv of radiation annually through background exposure.

Neither study used CT angiography for screening. "I believe very emphatically that the data to date don't support CT angiography as a screening tool at all," Dr. Min said. "In asymptomatic patients, we don't have any data of what to do with the results, and if treatment benefits them."

CT angiography is of greatest benefit for patients without known coronary disease who have low or intermediate pretest risk. "If you have a high pretest suspicion that someone has coronary artery disease, then direct progression to invasive coronary angiography or even myocardial perfusion imaging is probably a better alternative," he said.

The ACCURACY trial was unique in that it included all coronary artery segments in its analysis and all patients irrespective of their baseline coronary calcium score. In the CORE-64 trial, stented segments were excluded, as were patients with a calcium score higher than 600. As a result, the ACCURACY findings of high diagnostic accuracy are even more impressive and representative of actual clinical usage, Dr. Min said.

Between May 2006 and January 2007, ACCURACY investigators performed CCTA prior to conventional quantitative coronary angiography (QCA) on 232 patients who had typical or atypical chest pain and had been referred for evaluation at 16 U.S. centers. The images were obtained on a GE Healthcare LightSpeed VCT CT scanner, and analyzed at 15 different locations throughout the coronary tree. The investigators used equipment made by GE Healthcare, which sponsored the study. Dr. Min is on the speakers' bureau for GE Healthcare.

Three independent radiologists interpreted the CCTA images, and one independent radiologist interpreted the QCA images. No segments were excluded based on nonagreement between readers, and only one segment was debated among readers, Dr. Min said.

The patients' mean age was 57 years (range 31-82 years); 138 were male, 203 were white, and 13 were black, and their average body mass index was 31 kg/m² (range 16.8-50.5). Risk factors included a family history of coronary disease (169 patients), hyperlipidemia (158), hypertension (155), diabetes mellitus (47), obesity (87), smoking (127), and sedentary lifestyle (80).

QCA detected 82 blockages greater than 50% in 55 patients and 31 blockages greater than 70% in 34 patients.

For noninvasive CCTA, per-patient sensitivity was 93% and specificity was 82% for blockages greater than 50%; sensitivity was 91% and specificity was 84% for blockages greater than 70%, Dr. Min said.

Additional analyses of the ACCURACY data are being conducted, including a comparison of CT angiography to historical single-photon emission computed tomography (SPECT) imaging, cost-effectiveness versus standard of care, incremental benefit of CT angiography beyond traditional coronary calcium scoring, and interreader, interpatient, and intersegment reliability. ■