

# Criteria Elucidate the Role of Cardiac CT and MR

BY KERRI WACHTER  
Senior Writer

To help physicians keep up with ever-changing imaging technology, the American College of Cardiology Foundation and key specialty societies have released appropriateness criteria for the use of cardiac CT and MR.

These are rapidly emerging technologies that have primary care physicians and cardiologists alike looking for guidance on how to fit these tools into their practices, said Dr. Robert C. Hendel, who chaired the Appropriateness Criteria for Cardiac Computed Tomography and Cardiac Magnetic Resonance Imaging writing group (*J. Am. Coll. Cardiol.* 2006;48:1475-97).

In light of this need, the writing group is taking a somewhat novel approach, planning to revise the criteria every 12-18 months to keep up with new technology and evidence, said Dr. Hendel, who is a nuclear cardiologist with Midwest Heart Specialists in Fox River Grove, Ill. The first set of appropriateness criteria for imaging, released in October 2005, was for SPECT myocardial perfusion imaging.

The criteria aren't intended as hard and fast guidelines but instead represent the current expert thinking on when cardiac CT and MR should and should not be used. "Appropriateness criteria, in other words, are not substitutes for sound clinical judgment and practice experience with each patient and clinical presentation," the authors said.

Imaging technology changes rapidly, meaning that there can be a big lag between peer-reviewed research and clinical practice.

"I think that's one of the things that this document is intended to address because if you wait for the literature to catch up, it's never going to happen," said Dr. Geoffrey D. Rubin, the American College of Radiology's representative on the technical panel.

The technical panel rated 39 cardiac computed tomography (CCT) and 33 cardiac magnetic resonance (CMR) indications representing common patient presentations such as symptoms suggestive of ischemia, multiple cardiac risk factors in an asymptomatic individual, and specific scenarios with high clinical suspicion that are further stratified on the basis of factors such as clinical risk, prior test results, and the interval since prior testing.

Indications were scored 1-9, with appropriate indications scored 7-9, uncertain indications scored 4-6, and inappropriate indications scored 1-3. An imaging study was considered to be appropriate for an indication if the additional information, in combination with clinical judgment, exceeded negative consequences. Negative consequences include the risks of the procedure (i.e., radiation or contrast exposure) and the downstream effects of poor test performance (i.e., delays in diagnosis or inappropriate diagnosis).

In all, 13 CCT and 17 CMR indications were found to be appropriate and 14 CCT and 9 CMR indications were found to be inappropriate. For example, CMR was

deemed inappropriate (score of 1) for detection of coronary artery disease patients with chest pain with a high pretest probability of CAD.

Although CCT was considered appropriate for several scenarios beyond assessments of structure and function, more than 40% of the indications were in this area. Two-thirds of the appropriate and uncertain indications for CMR were related to assessment of structure and function. "These results support the strengths of CMR as a tool for defining the etiology of com-

plex patient presentations where the clinical suspicion is high," the authors said.

In addition, 12 CCT and 7 CMR indications were found to be uncertain. Indications were considered uncertain because either critical data were lacking or significant differences of opinion existed among panel members regarding the value of the method for that particular indication.

"Uncertain is an area that for the most part simply means that we just don't know enough yet," Dr. Rubin said.

It is striking that the criteria were developed with buy-in from the American College of Radiology, the Society of Cardiovascular Computed Tomography, the Society for Cardiovascular Magnetic Resonance, the American Society of Nuclear Cardiology, the North American Society for Cardiac Imaging, the Society for Cardiovascular Angiography and Interven-

tions, and the Society of Interventional Radiology.

Who should be performing cardiac imaging in general has been a matter of heated contention among cardiologists, radiologists, and interventionalists.

However, the technical panel included representatives from as many specialty and subspecialty organizations as possible and "we're very proud of this," Dr. Hendel said. The group hopes that these criteria serve as an endorsement for a more collaborative approach to cardiac imaging, he added.

On the flip side though, "it's usually not a problem when you can bring people together in a nonconfrontational environment where the issue of who should do what is not on the table," said Dr. Rubin, who is chief of cardiovascular imaging at Stanford (Calif.) University.

The document is also intended to serve as a template for better reimbursement for these tests.

Currently cardiac MR studies are reimbursed for the most part, said Dr. James C. Carr, director of cardiovascular imaging at Northwestern Memorial Hospital in Chicago. Dr. Carr served on the technical panel, representing the Society of Interventional Radiology.

Cardiac CT studies are not consistently reimbursed now though. "One of the problems is that the indications have not been clearly established for insurance companies," he said. "Hopefully this document will convince them that there are many situations where [cardiac CT] is indicated and hopefully they will consider reimbursement for these indications." ■

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## Supplemental Arm Pumping Puts Adenosine Testing on Par With Exercise Stress Test

BY PATRICE WENDLING  
Chicago Bureau

MONTREAL — Adenosine stress testing with supplemental arm pumping exercise had the same diagnostic accuracy as exercise stress testing in detecting significant coronary artery disease in a study of 302 patients.

The results validate a long-standing practice at Massachusetts General Hospital, Boston, where supplemental arm exercise with light weights—not arm exercise with squeeze balls and not a treadmill walk—has been used for a decade to prevent adenosine-related side effects during myocardial perfusion imaging.

Arm-pumping exercise is utilized in all patients who are unable to safely negotiate a treadmill, which includes many inpatients as well as elderly and arthritic patients and those with increased risk of falling because of seizure or balance disorders, Dr. Arash Kardan, of the hospital, said in an interview at the annual meeting of the American Society of Nuclear Cardiology.

Though not well studied or under-

stood, supplemental exercise is thought to mitigate adenosine-related bradycardia and hypotension via a neurocirculatory response, he said. "It really works; it's not just a distraction for the patient."

The study was presented in a poster at the meeting, and included 302 patients referred for clinically indicated rest-stress myocardial perfusion imaging (MPI) with technetium 99m sestamibi. Patients underwent either exer-

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cise stress testing using the standard Bruce protocol achieving 85% of maximum predicted heart rate, or received an adenosine infusion of 0.14 mg/kg per minute for 4-5 minutes in one arm and pumped a 2.5-pound weight with their opposite arm.

All patients underwent coronary angiography within 2 months of MPI. Positive MPI was defined as demonstrating a reversible defect, while posi-

tive angiography was defined as the presence of any lesion with greater than 50% stenosis. Patients with a past history of myocardial infarction or coronary bypass surgery were included for analysis. Overall, one-third of patients had prior reported coronary artery disease.

There were 158 patients in the exercise stress group, with a mean age of 63 years. The sensitivity was 91% and specificity 100%, the authors reported.

There were 144 patients in the arm exercise group, with a mean age of 68 years. Sensitivity was 84% and specificity 81%; the differences from the exercise stress group were nonsignificant. No adenosine arm tests required termination because of side effects. All exercise treadmill tests were completed as well, he said.

The hospital has performed 10,000 adenosine tests using the arm-pumping exercises, and less than 1% of tests have been terminated, Dr. Kardan said. "We've been doing this for years, and wanted to get the message out." ■

## Sleep Apnea Found in 70% of Patients With Coronary Disease

SALT LAKE CITY — The prevalence of obstructive sleep apnea in patients with coronary heart disease may be higher than previously thought, according to data presented at the annual meeting of the Associated Professional Sleep Societies.

In a study of 132 patients who had a history of myocardial infarction or angiographically verified coronary artery disease, the prevalence of obstructive sleep apnea was 70%, Robert M. Carney, Ph.D., reported in a poster presentation.

Some previous studies have suggested prevalence rates in the 50% range in this population, he noted.

Patients in the current study underwent 2 nights of polysomnography. Obstructive sleep apnea was defined as at least five episodes of obstructive apnea or hypopnea per hour, noted Dr. Carney, professor of psychiatry and director of the Behavioral Medicine Center at Washington University, St. Louis.

The finding underscores the importance of screening heart disease patients for obstructive sleep apnea, which has been shown to increase the risk of myocardial infarction in this population, he concluded.

—Sharon Worcester