Contrast Echo Detects CAD in Acute Heart Failure

Myocardial blood flow reserve and velocity reserve decreased relative to increasing CAD severity.

BY DIANA MAHONEY
New England Bureau

BOSTON — For acute heart failure patients with neither a history of coronary disease nor evidence of acute MI, myocardial contrast echocardiography can distinguish ischemic from nonischemic etiology, a study has shown.

The ability to identify underlying coronary artery disease in such patients has therapeutic and prognostic implications, reported Rajesh Janardhanan, M.D., in a poster presentation at the annual meeting of the American Society of Echocardiography.

A noninvasive bedside technique for evaluating acute coronary syndromes, myocardial contrast echocardiography (MCE) provides a simultaneous assessment of regional wall motion and myocardial perfusion using microbubble contrast agents.

To assess the sensitivity and specificity of the imaging tool in the evaluation of acute heart failure, Dr. Janardhanan of Brigham and Women's Hospital in Boston, and investigators at Northwick Park Hospital in Harrow, England, reviewed the imaging results from 52 consecutive patients with acute heart failure with no prior history of coronary artery disease (CAD) and no clinical evidence of acute MI on hospital admission.

All the patients in the study underwent echocardiography and MCE at rest and following dipyridamole stress. Additionally, all patients underwent coronary arteriography prior to hospital discharge. On coronary arteriography, 22 of the 52 patients had evidence of CAD, defined as more than 50% luminal diameter narrowing, Dr. Janardhanan said.

The sensitivity and specificity of MCE for detecting CAD in the 22 patients were 82% and 97%, respectively, with a positive predictive value of 95% and a negative predictive value of 88%. Among the various markers of CAD, including MCE, clinical variables, ECG, biochemical measures, and resting echocardiographic results, MCE "was the only [statistically significant] independent predictor of CAD," said Dr. Janardhanan.

Both myocardial blood flow reserve and myocardial blood velocity reserve decreased relative to increasing CAD severity, suggesting quantitative MCE data may be an effective tool for stratifying risk in patients with acute heart failure, Dr. Janardhanan concluded. ■

Risk Score Can Help Identify Patients At Risk for Contrast Nephropathy

BY MITCHEL L. ZOLER
Philadelphia Bureau

PONTE VEDRA BEACH, FLA. — An 11-point risk-scoring system can stratify the risk that patients face from contrast-induced nephropathy, on the basis of a validation study that involved more than 3,000 patients.

Applying the risk score in routine practice could identify at-risk patients who should receive a limited amount of contrast during angiography or a percutaneous coronary intervention. It could also identify patients who should receive more intensive prophylaxis, with 12 hours of intravenous hydration with normal saline before having radio-contrast, Kimberly A. Skelding, M.D., said at the annual meeting of the Society for Cardiovascular Angiography and Interventions.

The risk score was introduced last year by a team of physicians at William Beaumont Hospital in Royal Oak, Mich. (Am. J. Cardiol. 2004;93:1515-9). Scoring involves eight elements, and a patient can receive 0-11 points (see upper box). The patient scores 2 points if any of the following three features occurs: a baseline creatinine clearance rate of less than 60 mL/min, use of an intraaortic balloon pump during the coronary procedure, and an urgent or emergency coronary procedure. Five other features score 1 point each when present: diabetes, heart failure, hypertension, peripheral vascular disease, and treatment with 260 mL or more of contrast during the procedure.

The scoring system was derived from observations made in more than 10,000 patients and was initially verified with a second group of nearly 10,000 patients. The original report found that patients could be divided into four risk groups: low, with 0-4 points; moderate, with 5-6 points; high, with 7-8 points; and very high, with 9 or more points.

The new validation cohort review by Dr. Skelding and her associates included patients who underwent coronary interventions at St. Mary's Hospital in Rochester, Minn., during 2000-2003. This group included 3,213 patients with baseline data and follow-up that were complete enough to allow analysis.

The rates of contrast-induced nephropathy (CIN) and in-hospital mortality were closely linked with risk score in this new cohort (see lower box). Patients who scored 0-4 points had a 0.2% incidence of nephropathy during follow-up and a 0.5% rate of in-hospital death. Patients with a score of 5-6 had a 2.6% nephropathy rate and a 2.0% mortality rate. Patients with 7-8 points had an 8.2% nephropathy rate and an 8.4% mortality rate. And those with 9-11 points had a 17.3% nephropathy rate and a 25.4% mortality rate, reported Dr. Skelding, a cardiologist at the Mayo Clinic in Rochester, Minn.

This analysis also highlighted the poor prognosis that patients face once they develop CIN. In-hospital mortality occurred in 6.6% of patients who developed CIN, compared with a 1.2% rate in those who did not. Patients with CIN were 5.3-fold more likely to die in the hospital, compared with those without CIN, a statistically significant difference.

In addition to having a prognostic role, the risk score can help guide patient management to avoid CIN, Dr. Skelding said in an interview with this newspaper. Although a few elements of the risk score depend on events that occur during the coronary procedure, such as total contrast volume used and the need for an intraaortic balloon pump, most elements can be assessed prior to the procedure. Patients with relatively high scores before their procedure starts should first receive a 12-hour infusion with normal saline to help prevent CIN. The normal duration of hydration is 3 hours, Dr. Skelding said. ■

Calculating the Risk Score

	Points
Creatinine clearance <60 mL/min	2
Use of intraaortic balloon pump	2
Urgent or emergency procedure	2
Diabetes mellitus	1
Heart failure	1
Hypertension	1
Peripheral vascular disease	1
Use of >260 mL contrast during procedure	1

Source: Am. J. Cardiol. 2004;93:1515-9

Validating the Risk Score

Risk Score	Nephropathy Rate	In-Hospital Mortality Rate
0-4	0.2%	0.5%
5-6	2.6%	2.0%
7-8	8.2%	8.4%
9-11	17.3%	25.4%

Source: Dr. Skelding

Ominous Cardiac Perfusion Scans Warrant Notification

BY BETSY BATES
Los Angeles Bureau

LOS ANGELES — High-risk findings on myocardial perfusion studies require an immediate telephone call from a nuclear cardiologist to the referring physician, even when the temptation is to perform more tests to clarify the extent of cardiac viability, said Robert C. Hendel, M.D., at a meeting sponsored by the American College of Cardiology.

Dr. Hendel presented the case of a 31-year-old man, 6' 4" tall, 244 pounds, who presented with exertional chest pain. He had a history of radiation therapy for Hodgkin's disease. During cardiac function tests, the patient was only able to proceed 4.5 minutes on the Bruce protocol before he experienced chest pain with ST-segment changes lasting about 15 minutes.

The patient's nuclear single-photon emission computed tomography (SPECT) images showed significant ischemia and large regions of decreased perfusion.

Yet, in the interaction session attended by nuclear cardiologists, just over half of audience members voted that they would respond by immediately calling the referring physician. Other attendees split their votes among other options, including repeating the SPECT using pharmacologic stress, performing additional imaging to assess viability, or reporting the likelihood of single-vessel disease.

Clearly, those in attendance were influenced by the patient's young age and the fact that more studies might provide more precise information. However, the study's findings, combined with the patient's response to the cardiac function test, should be enough to warrant an immediate consultation with the referring physician, said Dr. Hendel at the meeting, cosponsored by the American Society of Nuclear Cardiology and Cedars-Sinai Medical Center.

"This is a very high-risk study," he said. "Our responsibility is to pick up the phone and communicate that kind of information."

In the case he presented, consultation with the referring cardiologist led to a referral to coronary angiography. The patient was found to have extensive coronary artery disease, including high-grade narrows (greater than 95%) in the proximal left anterior descending coronary artery involving the bifurcation of a large first diagonal branch. "This high-risk anatomy was unsuitable for percutaneous coronary intervention, and he was referred for bypass surgery," said Dr. Hendel following the meeting.

One week after his SPECT study, the patient underwent five-vessel bypass graft surgery. "He is doing well now, without symptoms."

Dr. Hendel, a former president of the American Society of Nuclear Cardiology who practices in Fox River Grove, Ill., said he was familiar with two lawsuits in the past 5 years in which both the nuclear cardiologist and internist were sued owing to a lack of timely notification of a high-risk finding. ■