Echo Data, Risk Score Predict Chest Pain Outcome

BY DIANA MAHONEY
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BOSTON — A novel risk score, comprising measures of wall motion and myocardial perfusion from contrast echocardiography and clinical variables, is a sensitive predictor of 1-year outcome in patients presenting to the emergency department with chest pain prior to obtaining troponin data, reported William Foster, M.D.

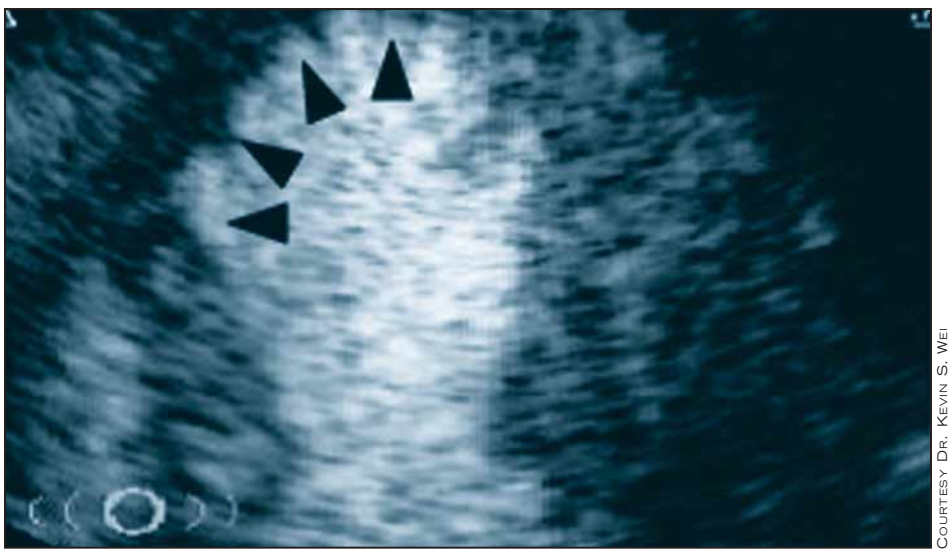
In the risk score development model and a subsequent validation model, the tool proved to be more effective for risk stratification than the use of cardiac troponin measures and clinical variables without the ultrasound data, said Dr. Foster in a poster presentation at the annual meeting of the American Society of Echocardiography.

Dr. Foster and colleagues at the University of Virginia in Charlottesville developed the risk score using clinical and myocardial imaging data from 973 patients presenting to the emergency department (ED) with chest pain that could not easily be attributed to a noncardiac cause and who did not have ST-segment elevation on their admission ECG.

The risk score stratifies the likelihood of developing primary or secondary events within 1 year of chest pain presentation in the ED. Primary events include all cause mortality and MI; secondary events include unstable angina, revascularization, and heart failure.

The clinical predictive factors considered in the risk score include age older than 60 years, presence of three or more coronary disease risk factors, known coronary luminal diameter narrowing of more than 50%, ST-segment deviation on ECG, two or more angina events in the previous 24 hours, and aspirin use in the previous 7 days. (See box, Risk Calculator.)

With echocardiography, regional function was characterized as normal or abnormal based on a 14-segment model. Myocardial perfusion was evaluated using the same segmented model and was deemed abnormal if there was no evidence of maximal opacification within a segment by five cardiac cycles. An echocardiographic study was considered abnormal if at least one segment was abnormal for either regional function or myocardial perfusion.



COURTESY DR. KEVIN S. WEI

In this contrast-enhanced image from the apical four-chamber view, arrows show a resting perfusion defect in the mid and distal septum of a patient with chest pain.

Each of these predictors is associated with a score between 0 and 100, based on estimates developed using logistic regression models. "The total risk score is the sum of all of these scores," said Dr. Foster.

Among the 973 patients in the development sample, the model showed "excellent discriminatory capacity," with an 86% probability of correct prediction, Dr. Foster said. About 60% of those with total risk scores of 200 or higher and 30% of those with scores of 150-199 had a primary or secondary cardiac event at 1 year. About 17% of patients with scores of 100-149, 7% of those with scores of 50-99, and 4% of those with scores of 0-49 had events within 1 year.

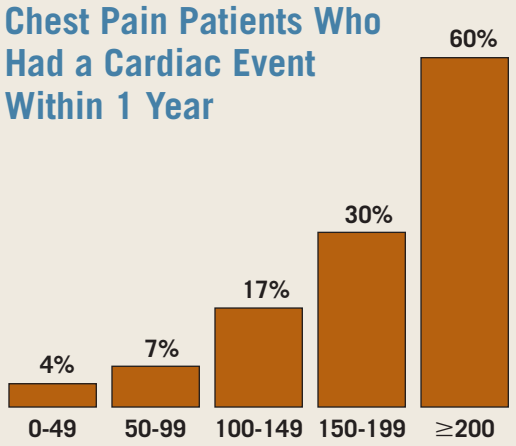
To validate the sensitivity of the scores as potential prognostic indicators, the investigators applied the risk score model prospectively in 232 patients followed for up to 1 year. "We saw the same pattern in the validation sample," Dr. Foster said. In fact, the discriminatory capacity of the risk score "was greater than clinical variables plus serum cardiac troponin," he said. The ability to formulate prognoses before obtaining troponin data could streamline the management of chest pain patients in the ED, Dr. Foster concluded. ■

Risk Calculator for Chest Pain Patients

Variable	Risk Score
Age >60 years	13
≥3 Cardiac risk factors	10
Aspirin use	21
≥2 Episodes of chest pain in 24 hours	73
Known coronary artery disease	44
ST-segment change	50
Abnormal regional function	100
Abnormal myocardial perfusion	37

Source: Dr. Foster

Chest Pain Patients Who Had a Cardiac Event Within 1 Year



Use of ACE Inhibitors Up in MI Patients, but Could Be Better

BY MIRIAM E. TUCKER
Senior Writer

WASHINGTON — Use of ACE inhibitors in patients hospitalized with acute myocardial infarction has increased over the past 15 years, but there is still room for improvement, Chyke A. Doubeni, M.D., said at a conference on cardiovascular disease epidemiology and prevention sponsored by the American Heart Association.

Use of ACE inhibitors (ACEIs) in the early treatment of acute MI has indeed risen since their use was recommended in the 1996 Joint American College of Cardiology/American Heart Association guidelines (J. Am. Coll. Cardiol. 1996;28:1328-428). But results of a large community study suggest that the agents are still underutilized in the elderly, patients with renal disease, those with prior acute MI, and patients who were not using ACEIs prior to hospitalization.

"Clinicians should be vigilant about appropriately considering the use of this therapy in all patients with acute myocardial infarction," commented Dr. Doubeni of the department of family medicine and community health at the University of Massachusetts, Worcester.

Of a total 7,989 Worcester residents hospitalized between 1990 and 2003 with acute MI at 16 acute care hospitals, 44% (3,545) received ACEIs. But of the 1,733 patients who had already been on ACEI therapy prior to hospitalization, 87% continued to receive it while in the hospital. In contrast, 33% of the 6,256 who had not previously been taking ACEIs were newly initiated on the therapy during hospitalization, Dr. Doubeni reported at the conference, also sponsored by the National Heart, Lung, and Blood Institute.

Clinicians should be vigilant about considering use of ACE inhibitors in all patients with acute MI.

DR. DOUBENI

Patients who were on ACEI prior to the index hospitalization were older (73 years vs. 69 years) and were significantly more likely than were those not previously taking these drugs to have hypertension (73% vs. 69%), diabetes (48% vs. 25%), and/or heart failure (41% vs. 15%). The patient population was mostly white.

Overall, receipt of ACEI therapy in hospitalized MI patients rose from just 23% in 1990 to 34% in 1995, then jumped to 50% in 1997, the year after the ACC/AHA guidelines were published. Although the rate of ACEI use remained unchanged between 1997 and 1999, it rose to 68% by 2003.

But these proportions differed substantially between prior users of ACEIs, in whom use during an MI hospitalization rose from 80% to 93% over the 14 year period, and new users, who accounted for just 15% of MI hospitalizations in 1990 and 57% in 2003.

Comparing 1990-1991 with 2001-2003, ACEI use more than doubled in several other subgroups, including those younger than 55 years and those with left ventricular ejection fractions less than 0.40, he reported.

Patients with diabetes, anterior acute MI, left ventricular dysfunction, and heart failure were significantly more likely to receive ACEIs during the entire study period, while there were no differences with regard to age or gender. Patients who had a history of renal disease were only about half as likely (adjusted odds ratio 0.55) to receive ACEI treatment. This is of concern, given recent data suggesting that the agents are protective in patients who have chronic kidney disease (Circulation 2004;110:3667-73).

During the hospitalization, patients who were also on aspirin or β-blockers and those undergoing cardiac catheterizations or percutaneous coronary intervention were all more likely to receive ACEIs, while those undergoing coronary artery bypass grafting and those receiving calcium channel blockers were less likely to have received them.

Overall, 8% of patients receiving ACEI therapy died while in the hospital, compared with 16% of those not on ACEIs. This survival benefit remained after the investigators factored in age, gender, medical history, characteristics of the incident MI, in-hospital complications, and study year. Similar though somewhat attenuated benefits were observed when the analysis was repeated in patients surviving beyond 24 hours of hospitalization, and remained for all subgroups examined. ■