Pretest Predicted ACS in Low-Risk Patients

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CHICAGO — A computerized pretest probability device accurately predicted acute coronary syndrome in low-risk patients who present with chest pain, and significantly reduced exposure to thoracic imaging and return visits to the emergency department in a randomized, controlled trial in 400 patients.

The Web-based software device (PRETestConsultACS) produces a point estimate of pretest probability of acute coronary syndrome (ACS) based on eight predictor variables: age; sex; race; history of coronary artery disease; chest wall tenderness to palpation that reproduces chest pain; diaphoresis; ST depression greater than 0.5 mm in two leads; and T-wave inversion greater than 0.5 mm in two leads.

The variables are then entered into a personal computer or personal digital assistant that searches a large, stored database of previously evaluated patients for those who share the same profile of eight variables. The percentage of matched patients from the database who have ACS equals the pretest probability.

ACS included myocardial infarction; coronary stenosis greater than 60% prompting new medical management or revascularization; ventricular arrhythmia; cardiogenic shock; or bradycardia requiring therapeutic intervention.

After obtaining a clinician's estimate of pretest probability of an ACS, 400 patients (mean age, 46 years) and their emergency clinicians were randomized to receive a written printout from the computer, or not. In all, 31 patients were excluded because of cocaine use or because they left the study.

Pretest probability estimates of an ACS generated by the emergency clinician (mean, 4) correlated significantly with the estimates from the computerized device (mean, 4), according to a poster presentation at the annual meeting of the American College of Emergency Physicians.

A significant cardiovascular diagnosis was made in 36 (19.4%) of the 185 patients in the control group and 35 (19%) of the 184 patients in the intervention group.

Researchers discovered only one case of a missed or delayed diagnosis of ACS within 45 days, the study's primary safety end point, and that was in a patient who was assigned to the control group, lead investigator Dr. Jeffrey Kline and colleagues in the department of emergency medicine, Carolinas Medical Center, Charlotte, N.C., reported. The patient was diagnosed with unstable angina that was treated with a percutaneous intracoronary stent device 21 days after enrollment.

Exposure to imaging that imparted greater than 5 mSv and had a negative result was significantly higher in patients who had not had the pretest.

The rate of hospital admission of patients who had no significant cardiovascular diagnosis within 45 days was significantly higher in the control group (11%) than in the intervention group (5%).

The rate of exposure to a thoracic imaging test that imparted greater than 5 mSv and had a negative result was significantly greater among controls (19.4%) than patients in the intervention group (8.6%), the investigators reported. The lifetime risk of malignancy is thought to increase significantly after a dose of radiation that exceeds 5 mSv.

"If the results of this study are independently validated in a larger and different sample of patients, then clinicians will have evidence to justify the use of quantitative pretest probability, together with their own clinical instincts, to reduce excessive diagnostic testing in low-risk patients with chest pain," Dr. Kline said in an interview.

Median length of stay in the emergency department was not significantly different between the control (11.4 hours) and intervention (9.2 hours) groups.

Significantly more patients in the intervention group reported being "very satisfied" with the clinical explanation of their problem, compared with those in the control group (49% vs. 38%).

Based on telephone follow-up, patients in the intervention group were less likely than those in the control group to be readmitted within 7 days of their emergency visit (4% vs. 11%), according to the investigators, who reported no relevant conflicts of interest. ■