More sensitive blood test better at identifying heart attacks

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A highly sensitive blood test could help identify heart attacks in thousands of patients who would otherwise have gone undiagnosed, a study suggests.

In patients with a suspected acute coronary syndrome (ACS; such as heart attack or unstable angina), use of a more sensitive test to detect the protein troponin in blood was associated with increased diagnosis of a heart attack and improved identification of patients at high risk of another heart attack and death in the following year, according to a study in the March 23/30 issue of *JAMA*.

Recent reports have indicated that the latest tests for improving the sensitivity for detecting troponin can increase diagnostic performance and improve the early diagnosis of myocardial infarction (MI; heart attack). "Lowering the threshold for detecting cardiac troponin is a highly controversial issue among clinicians with cardiologists, physicians, and clinical biochemists uncertain as to whether the benefits of small improvements in sensitivity will outweigh the problems that may arise as a result of reduced specificity. Furthermore, whether lowering the threshold for detection of plasma troponin improves clinical outcomes in patients with suspected ACS is unknown," according to background information in the article.

Nicholas L. Mills, M.D., Ph.D., of the University of Edinburgh, Scotland, and colleagues conducted a study to determine whether lowering the diagnostic threshold for heart attack with a sensitive

troponin assay (test) could help identify patients at future risk of adverse events and improve clinical outcomes. The study was divided into 2 phases (validation and implementation). Although plasma troponin I was measured using a reformulated sensitive assay throughout both phases, only concentrations above the original diagnostic threshold (0.20 ng/mL or greater) were reported in the validation phase, and concentrations above the revised diagnostic threshold (0.05 ng/mL or greater) were reported during the implementation phase. Patients were stratified into 3 groups (less than 0.05 ng/ml, 0.05-0.19 ng/mL, and 0.20 ng/mL or greater). The study included patients admitted with suspected ACS to the Royal Infirmary of Edinburgh before (n = 1,038; February-July 2008, during the validation phase) and after (n = 1,054; February-July 2009, during the implementation phase) lowering the threshold of detection for myocardial necrosis (death of heart muscle cells).

Of the 2,092 patients with suspected ACS, 1,340 (64 percent) had plasma troponin assay concentrations of less than 0.05 ng/mL, 170 (8 percent) had plasma troponin assay concentrations of 0.05 to 0.19 ng/mL, and 582 (28 percent) had plasma troponin assay concentrations of 0.20 ng/mL or more.

During the validation phase, at 12 months, a greater proportion of patients with troponin assay concentrations of 0.05 to 0.19 ng/mL had died or been readmitted with an MI (39 percent) compared with those with troponin assay concentrations of less than 0.05 ng/mL (7 percent) or 0.20 ng/mL or more (24 percent).

During the implementation phase, lowering the diagnostic threshold to 0.05 ng/mL was associated with a lower risk of death and recurrent MI (from 39 percent to 21 percent) in patients with troponin concentrations of 0.05 to 0.19 ng/mL.

"In patients presenting with suspected ACS, the use of a sensitive

troponin I assay increased the detection of MI by 29 percent and identified patients who were at the highest risk of recurrent MI and death. Implementation of this assay and the diagnostic reclassification of these patients was associated with improved clinical management, fewer deaths, and fewer admissions with recurrent MI," the authors write.

"The appropriateness of continuing to lower the threshold of plasma troponin assay concentration to define increasing numbers of patients with MI may be questioned. This concern relates to the potential to reduce specificity and increase false-positive diagnoses of MI. Our study supports the contention that this is not the case, rather the concern relates to the potential for misclassification of high-risk patients through the use of outdated diagnostic thresholds," the researchers write. "The next generation of assays may define progressively lower thresholds for detection of plasma troponin that ultimately may lead to the definition of a normal reference range. These assays are necessary to assess whether further reductions in the diagnostic threshold are indicated."

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