Strategy appears to help rule-in, rule-out heart attack within one hour

August 13 2012

A strategy using an algorithm that incorporates high-sensitivity cardiac troponin T (hs-cTnT) values appears to be associated with ruling-out or ruling-in myocardial infarction (heart attack) within one hour in 77 percent of patients with acute chest pain who presented to an emergency department, according to a report published Online First by *Archives of Internal Medicine*.

Patients with symptoms that suggest an acute myocardial infarction (AMI) account for about 10 percent of all emergency department consultations. Along with clinical assessment, electrocardiography and measurement of cardiac troponin (cTn) levels are the diagnostic cornerstones. The development of sensitive and high-sensitivity cardiac troponin (hs-cTn) tests appears to have improved the early diagnosis of AMI, but how best to use these assays in clinical practice is not clear because the more sensitive tests have increased the number of positive results in conditions other than AMI, according to the study background.

Tobias Reichlin, M.D., of University Hospital Basel, Switzerland, and colleagues sought to develop and validate an algorithm to rapidly rule-in or rule-out an AMI. The prospective multicenter study enrolled 872 patients with acute chest pain presenting to the emergency department and AMI was the final diagnosis in 147 patients (17 percent). The algorithm incorporated hs-cTnT baseline values and absolute changes within the first hour.

The algorithm was developed in a sample of 436 patients and validated

in the remaining 436 patients. Applying the algorithm to the validation cohort, 259 patients (60 percent) could be classified as rule-out, 76 patients (17 percent) as rule-in and 101 patients (23 percent) as being in the observational zone within one hour. Cumulative 30-day survival was 99.8 percent, 98.6 percent and 95.3 percent in patients classified as rule-out, observational zone and rule-in, respectively, according to the study results.

"The use of this algorithm seems to be safe, significantly shortens the time needed for rule-out and rule-in of AMI, and may obviate the need for prolonged monitoring and serial blood sampling in 3 of 4 patients with chest pain," the authors conclude.

In a commentary, L. Kristin Newby, M.D., M.H.S., of Duke University Medical Center, Durham, N.C., writes: "With increasing ED [emergency department] overcrowding, more effective tools are needed to enable rapid triage of patients with possible MI [acute myocardial infarction]."

"With this study, Reichlin et al provide an important step forward in application of hsTn [high-sensitivity troponin] as a tool for triage of ED patients with possible MI. However much work remains to develop the evidence to bring hsTn testing and the algorithms they have developed to use in clinical practice," Newby continues.

"Finally, although touted as 'simple' by the authors, the need for multicomponent algorithms that are different for rule-in and rule-out and that vary by age group or other parameters will challenge application by busy clinicians unlikely to remember or accurately process the proposed algorithm. As such, it will imperative that hsTn algorithms, if validated, are built into clinical decision support layered onto electronic health records so that testing results are provided electronically to physicians along with the algorithmic interpretation to allow systematic application in triage and treatment," Newby concludes.

More information:

Arch Intern Med. Published online August 13, 2012.
doi:10.1001/archinternmed.2012.3698
Arch Intern Med. Published online August 13, 2012.
doi:10.1001/archinternmed.2012.1808