No improvement in outcomes with rapid, high-sensitivity troponin T testing protocol at one year

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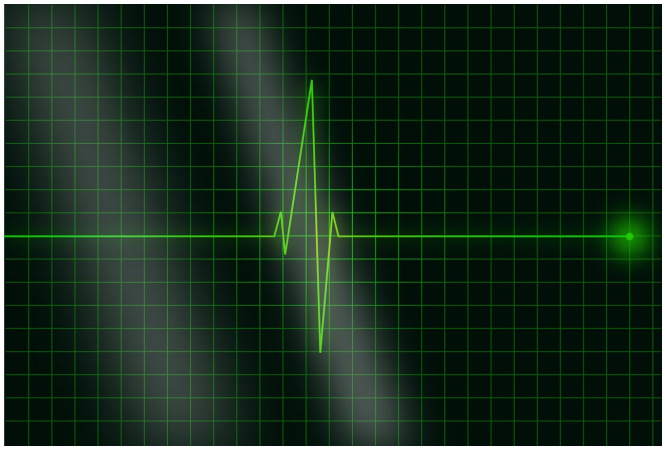

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Using more sensitive and frequent repeat testing of a blood test that indicates heart injury to guide the treatment of low-risk patients with symptoms of a possible heart attack resulted in patients being discharged earlier and receiving fewer cardiac stress tests but did not improve patient outcomes after one year, according to research presented at the American College of Cardiology's 70th Annual Scientific Session. In fact, a subset of patients receiving this more sensitive and frequent blood testing protocol were more likely to have a heart attack or to die during the one-year follow-up period compared with patients whose treatment was informed by the results of conventional blood testing procedures.

Troponins are proteins found in heart muscle that are released into the bloodstream when the heart muscle is damaged. Clinicians test for troponin in the blood when a patient visits a hospital emergency room with chest pain or other symptoms. While the detection of troponin in the blood may signal that a patient is having a heart attack, other heart problems, including heart failure or atrial fibrillation, or conditions such as a blood clot in the lungs or kidney disease can also cause elevated troponin levels.

"We wanted to know whether giving physicians greater information about troponin levels within a zero/one-hour repeat-testing protocol would change how they managed patients and whether such changes would lead to improvements in outcomes," said Derek Chew, MBBS, MPH, Ph.D., professor of cardiology at Flinders University in Adelaide, Australia, and principal investigator of the study. "We found that using high-sensitivity troponin in a rapid repeat-testing protocol, with recommendations for subsequent patient management, may have changed how physicians managed patients, but this did not lead to better outcomes."

Newer, highly sensitive laboratory assays are now routinely used to measure two types of troponin, known as troponin T and troponin I, in the blood. This randomized clinical trial used an assay that can detect levels of troponin T as low as five nanograms per liter (ng/L). By contrast, older, less-sensitive troponin tests accurately detected troponin levels only down to 29 ng/L. Few randomized controlled trials have looked at whether using the newer, more-sensitive troponin tests leads to better outcomes for patients, Chew said.

The study involved 3,378 patients (median age 59 years, 53% male) who visited emergency rooms at four metropolitan centers across South Australia with chest pain or other symptoms of a possible heart attack. Patients were eligible for the study if the results of their initial electrocardiogram, which measures electrical signals in the heart, did not show clear signs that they were experiencing

inadequate blood supply to the heart muscle.

The participants were randomly assigned to one of two groups. Participants in the standard-care group received a troponin test on arrival at the emergency department and a second test three hours later. Treating physicians were blinded to the test results below 29 ng/L (i.e., the less-sensitive troponin assay level), in accordance with standards of practice at the time, and subsequent care was at the treating physician's discretion.

In the intervention group, participants also received a troponin test on arrival at the emergency department, but they received a second test sooner—just one hour after the first. The results provided to physicians were unblinded, allowing them to see the troponin result down to a level of 5 ng/L (i.e., the high-sensitivity troponin assay level). Based on the initial high-sensitivity troponin test result and the change in the troponin level over one hour, participants were categorized as "rule out," "rule in" or "further observation" for a heart attack, with guidance for subsequent care provided based on their category. The study's primary endpoint was time to a heart attack or death from any cause during the 12-month follow-up period.

Follow-up data were available for 3,270 participants (108 withdrew from the study by 12 months). For 92% of participants, both initial troponin T tests showed levels below 29 ng/L. Patients in the intervention group were discharged earlier than those in the standard-care group and underwent fewer stress tests (which evaluate how well the heart performs during exercise) and slightly more angiograms (which use X-rays to assess blood flow through the arteries in the heart).

Overall, the researchers found no statistically significant differences in the number of heart attacks or deaths between the two groups during the 12-month follow-up period. However, in the subset of patients whose initial troponin levels were below 29 ng/L, 3.7% of those in the intervention group had a heart attack or died within the follow-up period, compared with 2.3% in the standard-care group. This difference amounted to a 60% increase in the risk of a heart attack or death for this subset of patients.

"This finding may imply that the practice changes observed with the use of a zero/one-hour, high-sensitivity troponin T testing protocol—fewer stress tests and slightly more angiograms—may be associated with an increase in the risk of death or a heart attack within 12 months," Chew said. "However, it is possible that this finding occurred by chance, and therefore it should be interpreted with caution. Overall, the finding may signal the continued utility of functional testing, such as stress tests, and a need for reconsideration of downstream investigations and therapies in the large presenting population with low-level troponin elevations."

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