Press release – 04 November 2024

Heart attacks could be ruled out early with new test, researchers find

As many as 60% of people presenting to emergency departments around the world with heart attack symptoms could be safely sent home, many at earlier stages, with the support of a new high-sensitivity cardiac troponin test, researchers in the US have found.

The assay from global health technology provider Mindray allows clinical teams to measure cardiac troponin I proteins that are released into the blood during heart attacks, and when the heart is damaged.

Found to be highly precise and sensitive for both men and women, the cardiac troponin I assay has been the focus of a new study carried out by world-renowned cardiac biomarker specialists at Hennepin Healthcare's Hennepin County Medical Center in Minneapolis, Minnesota. Early evidence has shown significant potential for clinical applications in helping to reduce pressure on busy emergency departments.

Researchers found that the test not only performed as well, if not better, than those already available in the market, but that it also had the potential to help clinical teams rule out many patients with symptoms suggestive of a heart attack at an early stage.

Focussing on more than 1,500 patients who presented to the inner-city hospital's emergency department with symptoms such as chest pain, arm pain, or jaw pain, the study found that 15% of early presenters could be ruled out for a heart attack based on a single blood test on arrival at hospital.

Typically for most assays of this kind, an initial blood examination would serve as a baseline measurement for early presenters, with a further test required to detect cardiac troponin I two hours later.

Combining this approach and applying a second blood sample to the Mindray assay after two hours, researchers also found that an additional 30-40% of remaining participants could also be safely ruled out with less than a 1% probability of an adverse event within 30 days.

Unusually precise measurements of cardiac troponin I made possible using the Mindray assay, meant additional individuals could also be ruled out. In total, across all cardiac troponin I measures, researchers were able to identify 60% of patients presenting to the emergency department with heart attack like symptoms, who could be safely sent home.

Professor Fred Apple, the study's principal investigator, a medical director in laboratory medicine at Hennepin Healthcare, professor at the University of Minnesota, and a former committee chair of the International Federation of Clinical Chemistry and Laboratory Medicine Committee on Clinical Application of Cardiac Bio-markers, said: "Patients who comes in to an emergency department with chest pain or arm pain, symptoms suggestive of a heart attack, would rather spend the night at their home with a surety that they aren't going to have a heart attack, versus a bed in the hospital. But sometimes it can be difficult for a clinician to determine whether or not that pain is related to the heart.

"Our preliminary findings around Mindray's high-sensitivity troponin I test are exciting for emergency medicine – with multiple ways this could be built into algorithmic clinical practice to help avoid overcrowding and enhance triage safety.

“Cardiac troponin alone doesn’t determine if you have had a heart attack, but it can tell the clinician if the heart has been injured, and when measurements are normal that it is safe to send a patient home.

“In 40 years of cardiac biomarker research, this assay is as good, if not better than any cardiac troponin assay I've worked with in my career. That it is so incredibly precise and analytically very sensitive to measure low cardiac troponin concentrations, opens new and unique possibilities when patients present early to an emergency department, so that clinicians can make informed decisions to send people home, without concern.”

In addition to ruling individuals out, findings also demonstrate that the assay can help to determine with high probability when patients are having a heart attack, with a high positive predictive value of approximately 70%. Researchers believe this could assist clinical decisions to immediately admit patients.

The Institutional Review Board approved study (MERITnI) was conducted alongside existing tests as patients presented to the hospital. Standard hospital procedures were used in the triage and care of patients, and the same blood samples drawn for routine clinical practice were also applied to the Mindray high sensitivity cardiac troponin I assay for research purposes, in order to evaluate the assay. The Mindray assay used in research was not used for patient care decisions during the study.

The assays were produced by Mindray after it acquired the Finnish company HyTest in 2021, where Professor Apple previously served on the board.

Preliminary findings are now undergoing peer review, but already additional possibilities are being explored. Future work in examining high sensitivity cardiac troponin I and high sensitivity cardiac troponin T assays are expected to inform applications that might help clinicians to better understand if myocardial injuries are chronic or acute – and help them to determine the best treatments and therapies for patients.

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Notes to editors

About Hennepin

Hennepin Healthcare is an integrated system of care that includes a nationally recognized Level I Adult and Pediatric Trauma Center, an acute care hospital, as well as a clinic system with primary care clinics located in Minneapolis and across Hennepin County. The healthcare system includes a 484-bed academic medical center, a large outpatient Clinic & Specialty Center, and a network of clinics. Hennepin Healthcare has a large psychiatric program, home care, and operates a research institute and philanthropic foundation. Hennepin Healthcare includes Emergency Medical Services, which operates a large fleet of ambulances serving 14 cities in Hennepin County. The system is operated by Hennepin Healthcare System, Inc., a subsidiary corporation of Hennepin County.

About Mindray

Mindray is a leading developer, manufacturer, and supplier of medical device solutions and technologies used in healthcare facilities around the globe. The company empowers healthcare professionals through innovative, high-value solutions that help create the next generation of life-saving tools of patient monitoring and life support, in-vitro diagnostics, and medical imaging. For more information, please visit http://www.mindray.com.