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HEALTHY HEART

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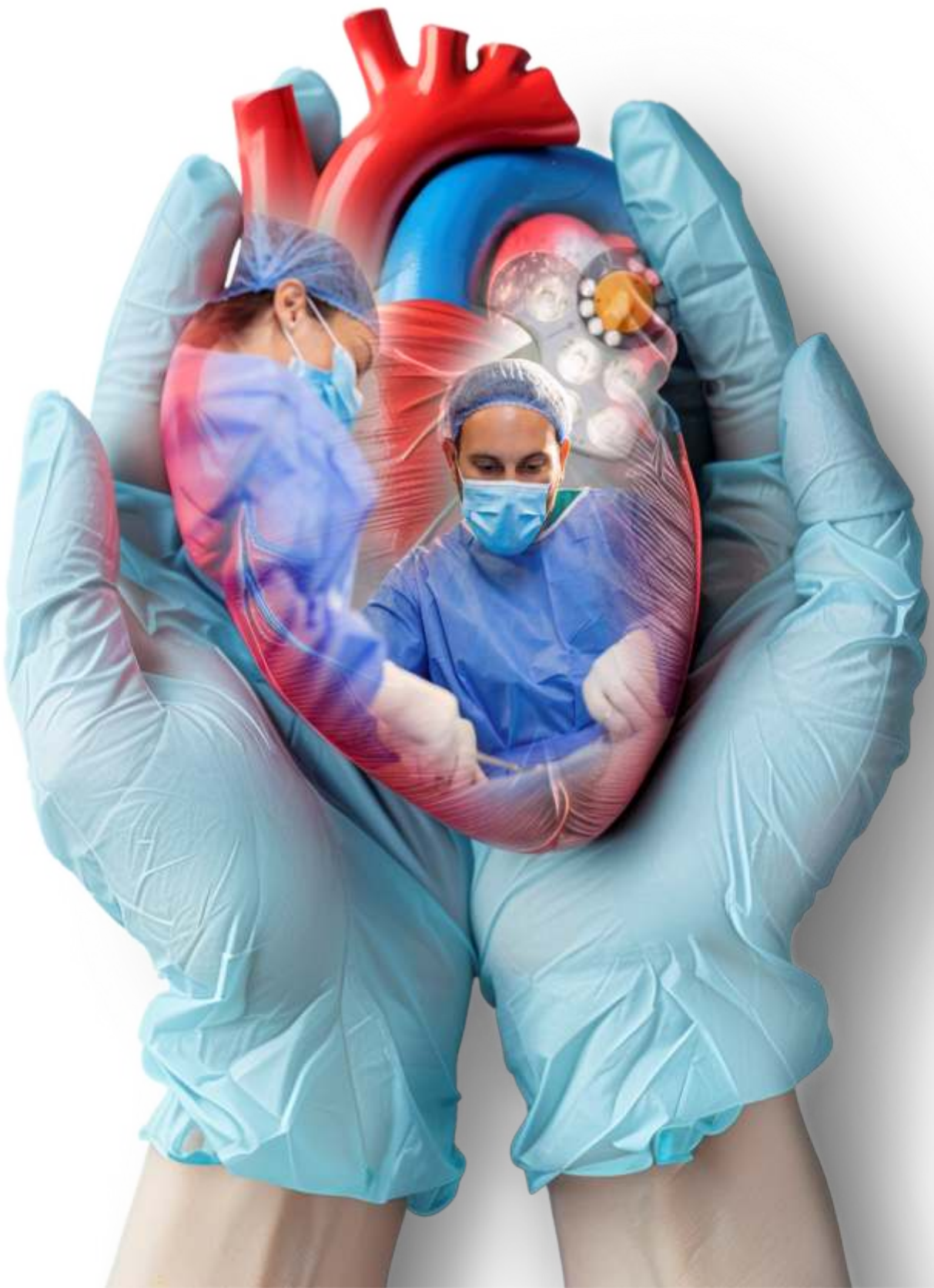

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Troponin Levels Tied to Increased CAD Risk, May Guide Imaging

Patients who have myocardial infarction (MI) ruled out in the emergency department but still have intermediate high-sensitivity cardiac troponin concentrations are three times more likely to have coronary artery disease (CAD) than patients who are ruled out with low troponin concentrations, a new study shows.

The finding suggests that high-sensitivity cardiac troponin could help select which patients need coronary computed tomography angiography (CCTA) to find occult CAD and guide the use of preventive therapy to prevent future MI, the authors say.

The study was published September 27 in the Journal of the American College of Cardiology.

The introduction of early rule-out pathways for myocardial infarction have increased the proportion of patients directly discharged from the Emergency Department.

Current guidelines are unclear how to further evaluate patients without myocardial infarction and there is little evidence to guide further testing in the high-sensitivity cardiac troponin era. As such, most clinicians select patients for further testing and follow up based on whether their symptoms sound like angina or not.

PRECISE-CTCA (Troponin to Risk Stratify Patients with Acute Chest Pain for Computed Tomography Coronary Angiography) was a prospective cohort study that enrolled 250 patients from the emergency department in whom myocardial infarction was excluded.

Patients with intermediate (5 ng/L to the sex-specific 99th percentile threshold) and low (< 5 ng/L) high-sensitivity cardiac troponin concentrations were invited for an early outpatient CT coronary angiogram.

The mean age of the study participants was 61 ± 12 years, and 31% were women.

Overall, 42.4% of patients had angina symptoms, 12.8% had typical angina,

and 29.6% had atypical angina. The remainder were classified as having nonanginal chest pain.

Patients with intermediate troponin concentrations were more than three times more likely to have CAD than those with low troponin concentrations (odds ratio, 3.33; 95% confidence interval, 1.92-5.78).

In contrast, the proportion of patients with typical or atypical angina who had CAD was the same as those who were considered to have nonanginal chest pain.

Most patients found to have CAD (53.2%, or 83 of 156 patients) did not have a previous diagnosis and were not on antiplatelet and statin therapies before they underwent CCTA.

Dr Nicholas L. Mills

"We know that patients with intermediate cardiac troponin concentrations are 10-fold more likely to have a cardiovascular event 1 year following the index hospital presentation than those with low cardiac troponins," senior author Nicholas L. Mills.

"The routine use of coronary computed tomographic angiography in those with intermediate troponin concentrations could help us identify patients with unrecognized coronary artery disease and target preventative therapy more effectively," Mills said.

These data can inform the selection of patients for CCTA, but further studies are needed to determine if this approach can improve outcomes, he said.

"We are currently evaluating whether troponin guided CTCA reduces the risk of future myocardial infarction or cardiac death compared to standard care in TARGET-CTCA, a large multicenter, randomized controlled trial funded by the British Heart Foundation."

Take Troponin Values into Account

Dr Kavitha Chinnaiyan

"Instead of focusing entirely on the 'rule-out' threshold of high-sensitivity troponin, perhaps the time has come to consider the actual troponin values in an individual patient to determine the need for additional testing with CTA [computed tomography angiography]," Kavitha Chinnaiyan, MD, and James L. Januzzi Jr, MD, write in an accompanying editorial.

"This study was a very interesting one," Chinnaiyan told theheart.org "Usually what happens is you come into the hospital, you get a high sensitivity troponin, if it is less than the cut off, then you're sent home; it's really not a heart attack so we don't need to worry about it. But that may not be the full story," she said.

"As these investigators show, even within the normal range, if your troponin is on the higher side, you have a higher burden of disease, your risk factors tend to be higher, and your risk for having an event is probably higher. They highlight the importance of looking at the actual value of the troponin rather than looking at it as being positive or negative," she added.

AHA Issues Scientific Statement on Myocardial Injury After Noncardiac Surgery

Accumulating evidence shows myocardial injuries are common after noncardiac surgery and prognostically important even with clinically silent troponin elevations.

To improve recognition and understanding, the American Heart Association (AHA) issued its first scientific statement reviewing the diagnostic criteria for myocardial injury after noncardiac surgery (MINS) and offering current best practices for surveillance, prevention, and management of this relatively new diagnosis, first introduced in 2014.

"That's only 7, 8 years ago and there was a lot of skepticism because the most important thing is that we are dealing with asymptomatic patients and if you have a troponin elevation, or any kind of lab elevation, most clinicians would say, 'why should you care, the patient doesn't have any symptoms'," Kurt Ruetzler, MD, PhD, told theheart.org.

"But over the last few years we were providing a lot of evidence that, unfortunately, a troponin elevation, no matter if the patient is symptomatic or not, is important in terms of mortality for these patients. So now is the time for this [statement] because we have enough evidence to summarize this and make everyone aware," said Ruetzler, an anesthesiologist at the Cleveland Clinic.

Research suggests about 20% of noncardiac surgeries are complicated by MINS and about 90% of patients have no identifiable symptoms.

Diagnostic criteria include at least one elevated postoperative troponin T level above the 99th percentile upper reference limit (URL) for the assay judged to be due to an ischemic mechanism (i.e., supply demand mismatch or athero-thrombosis), with or without ischemic symptoms or electro-cardiographic abnor-malities. When using fourth-generation and high-sensitivity troponin T (hs-TnT) assays, available "prognostically important" thresholds should be considered instead of the 99th percentile URL, the writing group notes.

Although the troponin elevations must occur in the first 30 days after surgery, data from the VISION trial show that 94.1% of MINS diagnoses occurred by the second day after

surgery.

The diagnosis of MINS is more likely to occur in people with pre-existing cardiovascular risk factors, including older age (especially 75 years and older), male sex, diabetes, hypertension, heart failure, obstructive sleep apnea, and anemia.

Studies also show that people undergoing emergency surgery have a two- to threefold higher adjusted odds of MINS, and that the risks for MINS are higher with several types of surgery, including vascular procedures (especially open aortic or infrainguinal surgery) and general abdominal surgery, the writing group notes

Importantly, evidence from prospective and retrospective analyses clearly indicate that troponin T elevations after noncardiac surgery are independently associated with short-and long-term mortality, Ruetzler said. In VISION, for example, the 30-day mortality rate was 3% with peak postsurgery hs-TnT levels of at least 20 ng/L to less than 65 ng/L and ballooned to 29.6% for patients with levels above 1000 ng/L.

"There are three important things," he said, "MINS is common, silent, and deadly."

Who to Screen

The writing group recommends troponin measurements before and in the first 48 to 72 hours after noncardiac surgery for patients at high clinical risk, such as adults 65 years and older or adults 45 years and older with established coronary or peripheral atherosclerotic cardiovascular disease.

If a postoperative troponin level is elevated but a recent previous measurement isn't available, a second test should be performed to determine whether a rising or falling pattern, indicative of acute myocardial injury, is present, they note.

"With this statement, we are providing the scientific background but the problem, of course, is there are a lot of resources needed to actually implement it and financial things to consider," observed Ruetzler. "But we strongly believe it needs to be done."

Although some guidelines recommend systematic screening with perioperative cardiac troponin T for patients at risk for postoperative complications, there has been resistance to the broad application of this strategy because of the lack of guidance regarding which patients to screen, which criteria to use for the diagnosis of perioperative myocardial injury, and how to manage these patients, observes clinical cardiologist Danielle Menosi Gualandro, MD, PhD.

"This statement is a major step in the field of myocardial injury and hopefully the first step to promote the broad use of troponin screening in people at risk of cardiovascular complications," she says in a related commentary. "Increased screening can help to improve patient care and reduce cardiac complications and mortality of patients undergoing noncardiac surgery."

Although there's no consensus about the diagnostic thresholds for several cardiac troponin I assays, Gualandro notes that her team recently reported that MINS and acute perioperative myocardial injury diagnosed with hs-troponin I are independent predictors of mortality and major cardiovascular events at 30 days and 1 year.

Postop Management of MINS

The writing group notes a lack of prospective data regarding management of patients diagnosed with MINS, but the consensus is that treatment should be tailored to the etiology. When there is doubt about the mechanism, additional cardiovascular testing may be warranted.

The document provides a lot of retrospective evidence that intraoperative and postoperative blood pressure is very important in terms of avoidance of MINS, Ruetzler said, but the overall optimal treatment options are unclear.

The strongest evidence available thus far on postoperative anticoagulation in MINS comes from the placebo-controlled MANAGE trial, in which daily dabigatran (Pradaxa, Boehringer Ingelheim) showed a 28% reduction in the risk for major vascular events over 16 months without increasing major bleeding.

"So-called secondary prophylaxis is extremely important for these patients, so it makes sense to borrow the evidence from patients with a myocardial infarction in the nonsurgical setting," Ruetzler said. "And there's a lot of evidence for aspirin but also for statins, smoking cessation, lifestyle changes, and weight loss, so I think all of this should be done in these patients."

Future trials will provide new insights into MINS, including the GUARDIAN trial, which is testing whether tight perioperative blood pressure management reduces serious perfusion-related complications after major noncardiac surgery and the recently completed but not yet reported POISE-3 trial, he said. The latter examined the effects of tranexamic acid versus placebo and managing hypotension versus standard of care on a composite cardiovascular endpoint at 1 year in patients at risk for a perioperative cardiovascular event undergoing noncardiac surgery.

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