Personalized evaluation for chest pain effective, may eliminate unnecessary testing

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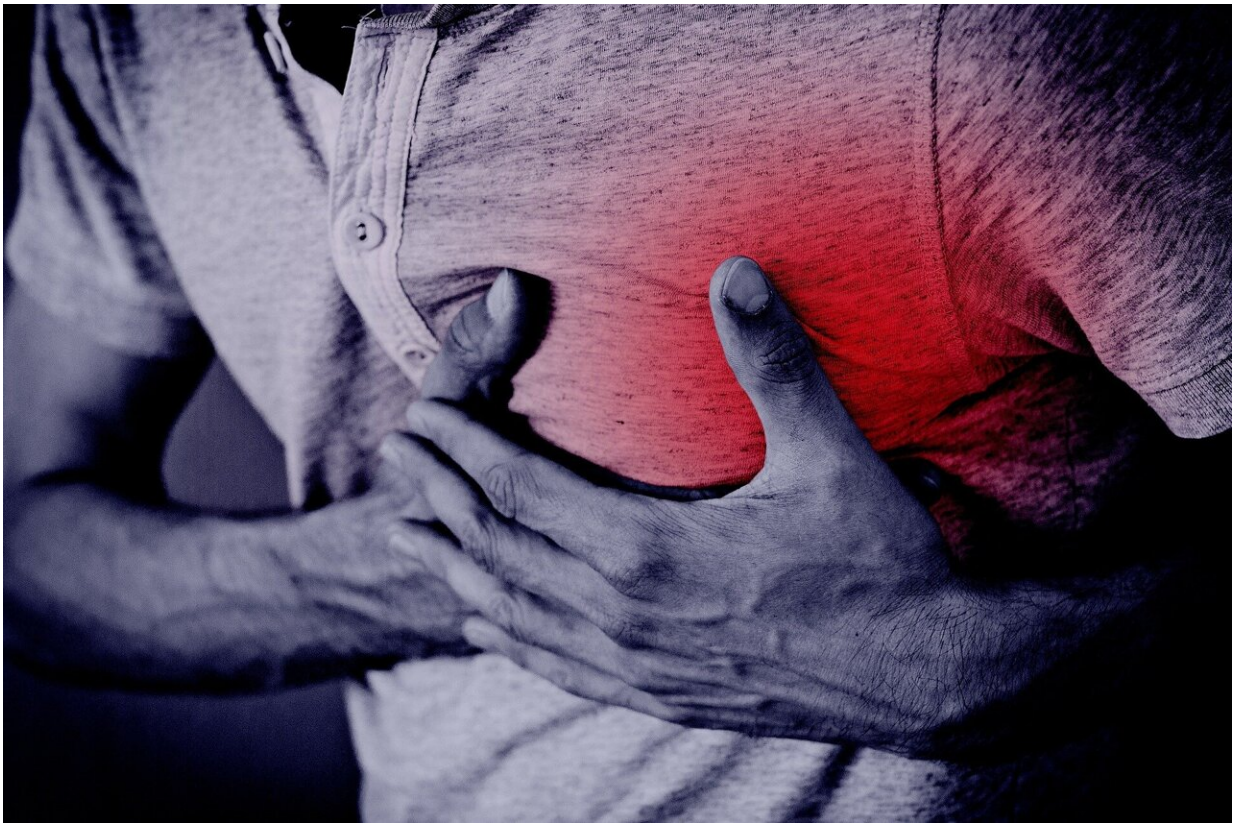

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For people with stable chest pain, a personalized "precision" testing approach led to more efficient evaluations for heart disease risk and improved diagnosis and treatment of coronary artery disease when

compared to usual care, according to late-breaking science presented today at the American Heart Association's Scientific Sessions 2022. The meeting, held in person in Chicago and virtually, Nov. 5–7, 2022, is a global exchange of the latest scientific advancements, research and evidence-based clinical practice updates in cardiovascular science.

Chest pain is a common reason people visit the doctor, and while most chest pain episodes are found not to be heart-related, it is the most common sign of possible heart issues. "Stable" chest pain means someone has not been diagnosed with heart disease but has chest pain upon physical or emotional exertion. Guidelines from the American Heart Association and the American College of Cardiology for evaluating chest pain indicate the importance of identifying people at low risk for heart disease so they can avoid unnecessary tests, which may involve increased costs and potential risks or complications. However, there is no randomized trial specifically detailing the most appropriate tests and screenings for people who have stable chest pain to determine whether they have heart disease.

This study aimed to determine whether a precision approach for evaluating people with stable chest pain improved efficiency over usual evaluations and if unnecessary testing was avoided, and care improved without putting patients at risk of a missed heart disease diagnosis.

"The PRECISE study provides the first randomized evidence for a risk-based testing strategy to reduce extra testing and improve efficiency of care while maintaining excellent patient outcomes, such as using guideline-directed medications, reducing chest pain and minimizing the number of heart attacks or heart disease-related deaths," said lead study author Pamela S. Douglas, M.D., FAHA, the Ursula Geller Professor of Research in Cardiovascular Disease at Duke University School of Medicine and a member of the Duke Clinical Research Institute in Durham, North Carolina.

The study included 2,103 adults at 65 outpatient centers in the U.S., Canada and Europe. All participants had symptoms that indicated potential coronary artery disease, with 83% reporting chest pain as their primary symptom, 10% reporting shortness of breath upon physical exertion, and a small percentage of people reporting other concerning symptoms such as nausea or dizziness. Half of the study participants were female, and the group's mean age was 58 years. Participants were randomized to one of two groups: either a precision evaluation strategy (1,057 people) or usual testing (1,046 people).

The precision evaluation strategy started with an assessment called the PROspective Multicenter Imaging Study for Evaluation of chest pain Minimal-Risk Score (PROMISE MRS or PMRS), designed to identify low-risk individuals who may not benefit from further testing. The PMRS is based on a person's cardiovascular risk factors such as smoking, diabetes, abnormal cholesterol levels, family history of heart disease and high blood pressure, as well as the patient's sex. A high PMRS indicated a low risk for future heart attack, therefore, the study hypothesized, testing could be postponed unless symptoms persisted or worsened.

Participants in the precision strategy who scored lower, meaning higher risk for heart disease, were referred for coronary computed tomography (CT) angiography with selective fractional flow reserve CT (FFRCT). Coronary CT angiography is a non-invasive diagnostic test producing three-dimensional images of the arteries in the heart to determine if there are any blockages that may indicate coronary artery disease. FFRCT assesses blood flow in more detail when coronary arteries are narrowed. All participants, regardless of randomization or initial testing, were encouraged to receive guideline-recommended care including preventive medication such as cholesterol-lowering medicine and anti-platelet medicine.

Participants randomized to usual testing received either stress testing or heart catheterization, as determined by the treating hospital and clinician team. During a stress test, a person is connected to equipment to monitor the heart while they walk on a treadmill or receive a medication that increases the heart rate or blood flow. Heart rate, breathing, blood pressure, the heart's electrical activity and pain levels are measured. During heart catheterization, a thin tube called a catheter is inserted into a large blood vessel that leads to the heart. Dye is injected through the catheter to show on an X-ray if arteries are blocked. The pressure and blood flow in the artery can also be measured during heart catheterization.

The study followed participants for one year after the evaluations and tracked the number of deaths (from any cause), non-fatal heart attacks and whether invasive testing revealed coronary artery disease. Researchers also monitored chest pain frequency and severity, and whether participants were taking medications for heart disease prevention.

The analysis found:

- About 20% of the participants (224) in the precision strategy group were considered minimal risk, of whom nearly two-thirds did not require testing during follow-up.
- About 20% (219) in the usual testing group were also at minimal risk for coronary artery disease, yet study sites were blinded to this determination and these participants had usual testing.
- Among participants assessed with the precision strategy, 84% underwent testing, mostly using CCTA with selective FFRCT. In the usual testing group, 93% underwent testing with 32% having a nuclear stress test; 30% had a stress echocardiogram; 11% had an exercise electrocardiogram; 10% received a cardiac MRI; and 10% received invasive catheterization as their initial test.

- In the precision screening group, 135 participants underwent heart catheterization that identified obstructive coronary artery disease in 108 of them. In the usual testing group, 177 people had a heart catheterization, with obstructive coronary artery disease found in 70.
- 18 people in the precision care group (1.7%) and 12 participants (1.1%) in the usual testing group died or had heart attacks; this difference was not statistically significant.
- After one year, cholesterol medication and antiplatelet medication use was higher among participants in the precision strategy group compared to the usual testing group: 50% vs. 42%, respectively, for cholesterol medicines and 36% vs. 27 for antiplatelet use.
- Frequent chest pain was substantially reduced in both groups, from 66% to 16%.

"We were pleasantly surprised by the reduced use of testing in the precision care group, more efficient use of heart catheterization and enhanced preventive medication use, all of which point to long-term benefits for patients' health," said Douglas. "Our findings may help with evaluating the millions of people globally every year who see their doctors with stable chest pain by accurately identifying those at low risk for clinical events who can safely delay diagnostic testing."

The study's limitations include that the precision strategy incorporated several actions reflective of real-world decision-making: risk stratification, deferred testing and use of CCTA with selective FFRCT as the initial test. The separate effects of each action cannot be determined. In addition, it's uncertain whether controlling medical care after the initial evaluations, rather than leaving it up to the enrolling sites, may alter patient outcomes. Since follow-up was limited to one year, research with longer follow-up is needed.

More information: Link to session abstract

Provided by American Heart Association