Coronary CTA rapidly rules out heart attack in emergency patents, reduces hospital stays

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Coronary CT angiography (CCTA) scans allow doctors to determine safely and more quickly which patients at low-to intermediate-risk for a heart attack can be discharged from hospital emergency departments (EDs) than traditional methods, according to the results of a large, multicenter American College of Radiology Imaging Network (ACRIN) trial published online today in the *New England Journal of Medicine.* The study found that low- to intermediate-risk patients who underwent a CCTA were more than twice as likely to be discharged and had significantly shorter hospital stays than those who received traditional care. The ACRIN trial also found that CCTA identified nearly three times as many patients with coronary artery disease as standard methods utilized. Results of the trial were presented today at the American College of Cardiology Annual Meeting.

"Nearly six million patients arrive annually in U.S. emergency departments for evaluation of chest pain at an estimated cost of over 3 billion dollars annually. Yet, up to 85 percent of these patients do not have cardiac-related problems," says Harold I. Litt, MD, PhD, the chief of cardiovascular imaging in Department of Radiology of the Perelman School of Medicine at the University of Pennsylvania and co-principal investigator of the ACRIN trial. "Prior research, including work by our research team at Penn, established that CCTA can rapidly identify the extent of coronary artery disease, if present, and suggested the safety of CCTA for clinical decision making."

The trial was designed to provide confirmatory evidence of CCTA's

safety so that ED physicians could feel confident about triaging low- to intermediate-risk patients according to the scan's results. Other strong trial design features were its conduct in a real world setting, as patient management following diagnostic testing was at the discretion of the treating clinician, and study participant selection was limited to patients expected to be admitted to the hospital or to have additional testing.

"The trial results have significant potential to establish a new standard of care for low- to intermediate-risk patients, dramatically reduce health care utilization and lower medical costs," says Judd Hollander, MD, the trial's co-principal investigator and the clinical research director in the Department of Emergency Medicine at the University of Pennsylvania. "In addition to identifying patients who could be safely discharged, the trial results showed evaluation with CCTA compared with current practice led to fewer patients having cardiac catheterizations that were found to be unnecessary and identified more patients that truly required hospital care."

"We know that having patients in the ED who don't require emergent care actually serves to increase the mortality rate for other patients in the ED who are acutely ill," elaborates Hollander. "CCTA could enable us to discharge a large subset of chest pain patients after finding they are not at risk for a cardiac event, and thus enhance the care for everybody who comes through the ED."

The trial's primary aim was to estimate the rate of major cardiac events (heart attack or cardiac death) within 30 days of the study participants who did not have significant coronary artery disease identified by CCTA. In a 2:1 randomization, 908 low- to intermediate-risk chest pain participants were enrolled in the CCTA rapid rule-out strategy group and 462 participants were enrolled in the traditional care rule-out treatment group.

Those with negative test results were discharged and interviewed by telephone at 30 days after enrollment. Participants with imaging or test results indicative of a heart muscle injury were admitted to the hospital for further care by the hospital's admitting team. The authors report that there were no deaths or heart attacks among the 640 participants with a negative CCTA within 30 days after their ED discharge.

"The study established that the CCTA strategy is safe and compares well to traditional care in terms of key patient-centered outcomes, such as length of hospital stay and likelihood of discharge," says Constantine Gatsonis, PhD, Director of the ACRIN Biostatistics and Data Management Center and the Center for Statistical Sciences at Brown University. "However, given available resources, it was not feasible to conduct an adequately large study to compare the CCTA strategy to traditional care in terms of the rates of death or heart attack. That comparison would require a much larger sample size and more costly trial."

Looking ahead, Pamela K. Woodard, MD, the head of advanced cardiac imaging at Washington University School of Medicine and chair of ACRIN's Cardiovascular Committee, comments, "The trial's secondary aims of comparing health care utilization of the two arms and their respective patient outcomes at the one-year follow-up will also be important data to report, given the increasing scrutiny of health-care delivery costs."

CCTA is a noninvasive heart imaging examination. High-resolution, 3-dimensional images of the moving heart are produced during a CCTA to determine if there are areas of narrowing or atherosclerotic plaques present in the coronary arteries.

Provided by American College of Radiology