Non-invasive scans accurately predict 30-day risk for patients with chest pain

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Coronary CT angiography (CCTA) -- a non-invasive way to look inside arteries that supply blood to the heart -- can quickly and reliably determine which patients complaining of chest pain at an emergency department can safely be sent home, according to research presented today at the American College of Cardiology's 61st Annual Scientific Session. The Scientific Session, the premier cardiovascular medical meeting, brings cardiovascular professionals together to further advances in the field.

Of the 6 million annual visits to U.S. emergency departments (EDs) for chest pain, up to 85 percent are not actually caused by heart problems. Much progress has been made in identifying high-risk patients, but low-risk patients pose assessment challenges that can be costly in risk, discomfort and recovery time for the patient and in healthcare resources. Most of these patients are admitted for traditional "rule-out" care that typically requires a hospital stay of about 24 hours and a stress test, with or without imaging. If results are positive, the next step is likely cardiac catheterization, an invasive and time-consuming procedure that involves threading a thin tube into the heart.

ED physicians have a standard for discharging a person with chest pain: less than 1 percent risk of heart attack or heart-related death over the next 30 days. For patients with no known heart disease, the key factor in judging that risk is whether any heart arteries show blockage of 50 percent or more. Cardiac catheterization is a common imaging technique used for this purpose.

"When EDs are crowded, all patients suffer," said Harold I. Litt, MD, PhD, chief of cardiovascular imaging in the Department of Radiology at the Perelman School of Medicine, University of Pennsylvania, Philadelphia, and the study's lead investigator. "Our primary goal was to power the study statistically to prove the safety of CCTA so that ED physicians could feel comfortable sending home patients who have negative results from CCTA scans, and we did that."

ACRIN PA 4005 is the first cardiovascular study conducted by the American College of Radiology Imaging Network (ACRIN). In this phase-4 trial, 1,393 patients at five centers were randomly assigned to traditional "rule-out" care or CCTA in a 1:2 ratio. Health care providers at each site made all decisions about tests and treatment for the traditional care group patients on an individual basis. The CCTA group followed a three-part protocol: (1) tests to measure blood levels of two substances associated with heart damage and risk of heart attack or stroke, (2) CCTA and (3) discharge if test results were negative.

None of the 640 patients with a negative CCTA had a heart attack or died within 30 days after discharge (30-day event rate of

The study also showed that CCTA was a better indicator than stress tests of finding patients with coronary artery disease (9 percent vs. 3 percent). "Stress tests are positive only when there's enough blockage to impair blood flow," Dr. Litt said. "CCTA lets you actually see atherosclerosis [a build-up of plaque in the arteries] and stenosis [narrowing of the arteries], even if that's not what's causing your chest pain that day."

Finally, the trial found clear benefits for CCTA compared with traditional care in several categories of resource use: number of patients discharged rather than admitted to the hospital (50 percent vs. 23 percent), median length of stay (18 hours vs. 25 hours) and median length of stay for patients who had a negative CCTA or stress test (12

hours vs. 25 hours). Researchers will be gathering costs associated with these findings and talking with both groups to analyze 30-day and one-year utilization and cost-effectiveness. In-hospital and 30-day cost data are expected within six months. Researchers also recorded data about arterial plaque that will be analyzed in the future.

This study will be simultaneously published in *New England Journal of Medicine*.

Provided by American College of Cardiology