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NEWS

RSNA Press Release

New Standard Proposed for Coronary Artery Calcium Screening

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At A Glance

- Scoring methods vary for computed tomography (CT) screening of coronary artery calcium, an indicator of early heart disease.
- An international consortium of scientists, physicians and manufacturers of CT equipment has developed a new standard for measuring coronary artery calcium.
- This new standard also allows for lower doses of radiation for small and medium-size patients.

CHICAGO — Computed tomography (CT) scanning of the coronary arteries for calcium is widely used as a noninvasive method for assessing early heart disease. However, because imaging equipment settings and individual physician interpretation can affect a patient's diagnosis, an international consortium of scientists, physicians and CT manufacturers has developed a new standard for measuring the amount of calcium found in a person's coronary arteries. The recommendations were presented today at the 89th Scientific Assembly and Annual Meeting of the Radiological Society of North America (RSNA).

"The original way of scoring calcium was good, but it had weaknesses," said Cynthia McCollough, Ph.D., lead author of the research. "We've addressed many of those weaknesses, added an important calibration step so the reported values can be compared from one test to another, even on different brands of equipment, and adjusted the radiation dose according to a patient's size."

Most radiologists and cardiologists agree that the presence of coronary artery calcium (CAC) is a statistically valid predictor — independent of traditional risk factors — of increased risk for future coronary events, according to Dr. McCollough, associate professor of radiologic physics at the Mayo Clinic College of Medicine in Rochester, Minn.

"The problem has been in the variability of the scoring in CAC screening," Dr. McCollough said. "Every day, there are a variety of CT scanners using different scoring systems producing CAC screening results. In order for these numbers to be meaningful and comparable, we need to be measuring and scoring in the same way."

Using specially developed testing software and simulated human chests and hearts with fixed amounts of calcium, the researchers were able to generate a more accurate, calibrated

result, independent of the scanner being used or the patient's size. The new standards also include recommendations that allow for reduced radiation doses for small and medium-size patients. The consortium's research lays the groundwork for a database that will reference a patient's calcium score against the scores of others who are the same age and gender.

"The clinical success of CT scanners for detecting and quantifying coronary artery calcium requires some method of assessing patient risk based on calcium burden, patient age and gender," Dr. McCollough said.

Recent studies have shown that the presence of calcium in the coronary arteries is direct evidence of atherosclerosis — a narrowing and hardening of the arteries due to a build-up of plaque. The plaque consists of fat, cholesterol and calcium. Using a CT scanner, radiologists are able to determine the number and density of calcified plaques in the arteries.

The consortium, which included participation from four major CT manufacturers — GE Medical Systems, Philips Medical Systems, Siemens Medical Solutions and Toshiba Medical Systems — was formed to reach a consensus on a comprehensive measurement system for coronary artery calcium. The group, started in late 1999 by Dr. Richard White, a cardiovascular radiologist at the Cleveland Clinic, developed the new standard using multi-detector-row CT (MDCT) systems, but the standard is also applicable to the electron-beam CT (EBCT) scanners often used for CAC screening.

Co-authors of the Mayo study were Willi A. Kalender, Ph.D., and Stefan Ulzheimer, Ph.D., from the Institute for Medical Physics in Erlangen, Germany; and Sandra S. Halliburton, Ph.D., Richard D. White, M.D., from the Cleveland Clinic. The study represents the work of the consortium, whose members come from leading healthcare centers and universities in the United States, Europe and Israel. (W.K. is a consultant for QRM and Siemens Medical Solutions.)

RSNA is an association of more than 35,000 radiologists, radiation oncologists and related scientists committed to promoting excellence in radiology through education and by fostering research, with the ultimate goal of improving patient care. The Society is based in Oak Brook, Ill.

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A Multi-scanner, Multi-manufacturer, International Standard for the Quantification of Coronary Artery Calcium Using Cardiac CT

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