Quick, painless test can rule out coronary disease in patients complaining of chest pain.

By Bob Roitblat

A man in his 40s, complaining of chest pain, goes to his primary care physician. He has no known heart disease; he is a few pounds overweight and sits behind a desk all day. How likely is he to die from a coronary event with the next 10 years? CT coronary angiography (CCTA), a new, noninvasive test, offers a fast and reliable means of ruling out the presence of relevant coronary artery stenoses.

"5.5% (9 million) of Americans aged 20-79 years are at intermediate risk of cardiac death or nonfatal myocardial infarction within the next 10 years, using the standard NCEP[1] definition of intermediate risk—two or more risk factors plus a Framingham score[2] of 10%-20%," according to Jon G. Keevil, M.D., of the department of medicine at the University of Wisconsin, Madison.[3] "And using the most liberal definition of all—not even bothering to count risk factors, and instead labeling everyone with a Framingham score of 6%-20% as intermediate-risk—then 16.2% qualify," says Dr. Keevil.

Identifying and treating coronary artery disease (CAD) in its early stages has a positive affect on patients' health and is much less expensive than treating far-advanced cardiovascular disease.

One traditional test for determining the presence and severity of CAD is myocardial perfusion imaging (MPI), that indirectly assesses arterial blockage. This test is done with a nuclear camera over a period of up to several hours. Another traditional test is the invasive coronary catheterization angiogram. A conventional angiogram is an expensive procedure with a small but definite risk of complications, and that requires either a brief hospitalization or a period of observation for several hours after the procedure. According to Dr. Armin Zadeh, Director of Cardiac CT at Johns Hopkins School of Medicine,[4] "the complication statistically at least of dying with a diagnostic cardiac catheterization is 1 in 1,000. There's still 1 in 500 of having strokes. The vascular complication rate is really quite drastic…."

A 20-minute CCTA presents less risk to the patient than invasive angiography; can reliably rule out the presence of significant CAD in patients with a low to intermediate probability of having CAD; and can reliably achieve the high degree of diagnostic accuracy and technical performance necessary to replace conventional angiography. CT coronary angiography is also considered a more efficient and definitive alternative to MPI, at approximately the same level of radiation exposure.

CT coronary angiography uses a CAT scanner, combined with iodine-based contrast agents, to generate cross sectional views of the heart and coronary arteries. An advanced 3D workstation is used to process the images obtained, to depict cardiac and vascular anatomy. A radiologist or cardiologist evaluates the rendered images and reports his or her findings.

But not all patients with chest pain have coronary artery disease.

In an article published in *Radiology Today*[5], Dr. David Dowe, MD and COO of Atlantic Medical Imaging, stated, "… primary care doctors love that the exam (CCTA) tells them exactly where the patient stands with coronary artery disease. It basically answers the question, does this patient have coronary heart disease or not? Many times patients have been cycled through cardiology when in fact they should have gone right to a gastroenterologist because their chest pain is esophageal in origin."

Coronary CTA helps the primary care doctor place patients into the proper specialist's hands without the patient having to see a cardiologist, pulmonologist, and gastroenterologist. The advantage to the patient is the avoidance of unnecessary and potentially risky tests and their related costs and inconveniences.

Finally, with CT's ability to image the heart as part of a larger scan, the CCTA doubles as a generalized chest scan where tumors, aneurysms, embolisms, and other non-cardiac anomalies may be identified.

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[1] National Cholesterol Education Program
[2] A simple coronary disease prediction algorithm using categorical variables, used to predict multivariate coronary heart disease risk in patients without overt coronary heart disease. Developed at the Framingham Heart Study, National Heart, Lung, and Blood Institute, Framingham, Mass.
[3] 2005 annual meeting of the American College of Cardiology, as reported in the April 15, 2005 edition of *OB/GYN News* article by Bruce Jancin.
[4] Interview was conducted in November 2006 by Burt Cohen of Angioplasty.Org and posted on their website.
[5] Radiology Today Interview: David A. Dowe, MD — Putting Cardiac CT Angiography Into Practice *Radiology Today* Vol. 7 No. 4 P. 24