Studies of chest pain patients with conventional 64-slice and dual-source CT add to a growing base of evidence suggesting that CT is well suited to rule out acute coronary syndrome in the emergency room and to identify coronary artery in-stent restenosis. An initial study of 256-slice CT presented at the RSNA meeting was encouraging, but the specter of high radiation exposure—especially exams covering the entire chest—challenged researchers to find better ways to reduce dose.

Several large single-site studies demonstrated that single-source 64-slice and dual-source CT angiography can with near certainty rule out the presence of acute coronary syndrome in emergency room patients with an intermediate or low risk of myocardial infarction. The findings suggest that multislice CT will reduce unnecessary hospitalizations and the time patients wait for definitive enzyme and treadmill test results, said Dr. Christoph Becker, section chief of CT at the University Hospital of Munich-Grosshadern in Germany.

A University of Pennsylvania study of 203 low-risk patients supported this view. The average length of stay for patients who underwent 64-slice CT as part of their initial assessment was slightly less than 15 hours, compared with 23 hours for the conventional admission and workup.

Thomas Jefferson University researchers led by Dr. Ethan Halpern reported that a 64-slice CT triple rule-out exam can, with 99.3% certainty, dismiss the presence of ACS in the ER for chest pain patients at mild or intermediate risk. The test also diagnosed pulmonary emboli and other noncardiac sources of pain.

Dr. Thorsten R.C. Johnson of the University Hospital of Munich-Grosshadern described how whole-chest exams performed with dual-source CT identified the cause of chest pain in 83 of 109 patients (76%). The per-segment sensitivity, specificity, and positive and negative predictive values for identifying significant coronary artery disease were 100%, 99%, 79%, and 100%, respectively. Occluded bypass grafts were found in five patients, and noncoronary findings included 10 pulmonary emboli, seven aneurysms, six aortic dissections, and six instances of neoplastic disease.

In separate preliminary studies, German and Korean researchers found good results in evaluating in-stent restenosis with dual-source and single-source 64-slice CT, respectively. Radiation exposure can be a problem, however, especially for full-chest data acquisitions.

Every centimeter of scan range for MSCT exposes the patient to about 1 mSv, according to Becker. Imaging only the heart typically involves about 12 mSv. For complete chest coverage, the effective dose is 18 mSv.

But reduction strategies are being evaluated. In a retrospective study of 906 patients, Dr. Robert Jennings and colleagues from Fairfax Radiological Consultants in Virginia showed that prospectively gated axial CTA performed on a 64-slice scanner delivered a mean effective dose of 2.6 mSv.

Dr. Hetal Patel, a radiologist with Hartford Hospital-Jefferson Radiology in Hartford, CT, concluded after evaluating 600 CTA exams for pulmonary emboli that an abbreviated field-of-view can lead to a 48% cut in radiation dose for CT PE exams and a 96% dose reduction compared with full-view 64-slice CT triple rule-out, without affecting the diagnostic sensitivity of either procedure.

French researchers led by Dr. Jean-Louis Sablayrolles reported a mean effective dose of 5.6 mSv for 64-slice cardiac exams using SnapShot Pulse, an axial step-and-shoot technique with a prospectively gated imaging strategy. For aorta/bypass exams, it was 9.6 mSv. No study presented at the 2007 RSNA, however, was powerful enough to categorically define a clinical role for cardiac CT, according to session moderator Dr. Andre J. Duerinckx.

"We need more large multicenter trials, with many more patients," Duerinckx said.

The CorE 64 trial, a multicenter, multinational trial, has recently shed light on the ability of cardiac CTA to rule out the presence of coronary artery disease. The study, presented at the 2007 American Heart Association meeting in November, found among 291 patients scheduled for cardiac catheterization that 64-slice CTA detects 91% of patients with significant stenoses and accurately rules out the presence of the disease for 83%.
Several more trials of similar size and predictive power are nearing completion, according to Dr. Suhny Abbara, director of cardiovascular imaging at Massachusetts General Hospital. The watchword for radiologists and cardiologists seeking to apply clinical cardiac CT is: stay tuned.

Disclosures:

Source URL:
http://www.diagnosticimaging.com/articles/cardiac-ct-studies-pose-questions-clinical-role

Links: