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Medical University of South Carolina Researchers First to Publish Report on New Computer System to Enhance Coronary CT Angiography Use in Ruling Out Coronary Artery Stenosis

Charleston, SC - new automated computer system shows promise in enhancing the ability of coronary CT angiography (cCTA) to rule out significant stenosis (narrowing) of coronary arteries in patients with chest pain at low to moderate risk of coronary artery disease (CAD). Several million patients are hospitalized each year to definitely determine whether they suffer from CAD. The new computer system enhances the ability to quickly exclude significant narrowing or blockage of the heart vessels through use of cCTA and thus has significant potential to assist in reducing unnecessary hospitalizations. The results, the first peer-reviewed published analysis of a fully automated, computer supported cCTA coronary stenosis detection system, appear on-line in *European Radiology*.

"Computer aided detection has been integrated into clinical practice for a number of diseases, but surprisingly to date not to CAD," said Joseph Schoepf, MD, Professor of Radiology and Cardiology, Director of Cardiovascular Imaging at the Medical University of South Carolina (MUSC), and lead investigator in the study. "CAD is the most important socioeconomic healthcare problem in the western world and there is an urgent need for new methods to improve timely and accurate detection and reduce costs".

CAD is estimated to affect approximately 16 million Americans, causes 1.2 million heart attacks, and over 450,000 deaths. The direct costs of CAD are estimated at over $87 billion. Several million patients with chest pain for whom CAD is ultimately ruled out are admitted to the hospital from emergency departments each year, at a cost of over $10 billion.

cCTA is being used increasingly as a non-invasive procedure for coronary blood vessel analysis, particularly as a means to rule out significant disease in patients with atypical presentation. However, successful interpretation of cCTA requires considerable expertise. "The findings of this study suggest that if used as a 'second reader,' the high negative predictive value demonstrated by this system may enhance the confidence and efficiency of excluding significant stenosis based on a normal or near-normal cCTA study," Dr. Schoepf noted.

In the study led by Dr. Schoepf and others at MUSC, researchers evaluated the system, called the COR Analyzer®, with cCTA in patients who also underwent invasive coronary catheter angiography due to suspected CAD. The system was developed by Rcadia Medical Imaging and is FDA cleared. In the study, none of the patients who were cleared by the system were found to have significant stenosis by invasive coronary catheter angiography (100 percent negative predictive value). Moreover, the researchers found that the system had relatively high accuracy overall in detecting significant stenosis.

"Use of computer aided algorithms for other diseases are effective in ruling out disease but have been complicated by the sometimes overwhelming number of false positives," Dr. Schoepf continued. "Compared to computer systems developed for other diseases, the performance of the algorithm evaluated here is comparatively high; particularly, the low number of false positives along with the 100 percent sensitivity and 100 percent negative predictive value on a per patient basis appear promising."

The study investigated 59 patients without known prior CAD who had been referred for invasive coronary catheter angiography due to atypical chest pain or an abnormal cardiac blood flow study. In the study, 19 of 59 patients had significant (50 percent vessel narrowing or more) coronary stenosis and significant stenosis was ruled out in 40 patients based on invasive coronary catheter angiography. The COR Analyzer correctly identified all 19 patients with significant stenosis in any vessel, and correctly excluded significant stenosis in 26 of 40 patients. The negative predictive value was 100 percent on a per patient basis, while the algorithm had 100 percent sensitivity, 65 percent specificity, and 58 percent positive predictive value compared with invasive coronary catheter angiography. The COR Analyzer System automatically processes images acquired on cCTA and generates comprehensive results and corresponding reports within minutes. The system's algorithm determines the presence of significant lesions (more than 50 percent stenosis) in the coronary arteries and visualizes the results through the use of detection marks to indicate the location of candidate lesions.

Using the system as a second reader, a physician in an emergency room setting may find reassuring verification of his or her exclusion of significant stenosis based on a normal or near-normal cCTA study. "This may be particularly helpful in on-call situations where relatively inexperienced trainees are increasingly called upon to rule out significant coronary artery stenosis in patients with acute chest pain using CT," the researchers observed.

The paper is entitled, "Automated Computer-Aided Stenosis Detection at Coronary CT Angiography: initial experience" **[add url]**. In addition to Dr. Schoepf, the authors on the study included Elisabeth Arnoldi, Mulugeta Gebregziabher, Luis Ramos-Duran, Peter L. Zwerner, Philip Costello, and Christian Thilo from the Medical University of South Carolina, Roman Goldenberg, Rcadia Medical Systems, and Konstantin Nikolau and Max Reiser from Ludwig-Maximilians University (Munich, Germany).

About MUSC

Founded in 1824 in Charleston, The Medical University of South Carolina is the oldest medical school in the South. Today, MUSC continues the tradition of excellence in education, research, and patient care. MUSC educates and trains more than 3,000 students and residents, and has nearly 10,000 employees, including 1,300 faculty members. As the largest non-federal employer in Charleston, the university and its affiliates have collective annual budgets in excess of $1.3 billion. MUSC operates a 600-bed medical center, which includes a nationally recognized Children's Hospital and a leading Institute of Psychiatry. For more information on academic information or clinical services, visit www.musc.edu. For more information on hospital patient services, visit www.muschealth.com.

About Rcadia

Rcadia Medical Imaging develops and markets automated image processing software products for blood vessel analysis in patients with suspected cardiovascular disease. The company's first FDA-cleared product, the COR Analyzer™ System, provides fully automated, real-time analysis of Coronary CT angiography to enable the practical application of cCTA in detecting significant coronary artery disease. The COR Analyzer improves the utility of Coronary CTA studies in the emergency department to triage chest pain patients and optimizes work flow in cardiology and radiology departments. Learn more at www.rcadia.com