冠動脈CT血管造影は胸痛のトリアージに役立つ（Abstract# SSC01-04）

自動冠動脈血管造影のソフトウエアは胸痛患者の救急トリアージに役立つ可能性があることが示された

Automated coronary CT angiography software demonstrates potential in emergency triage of patients with chest pain

自動冠動脈CT血管造影（CCTA）リーダーでの陰性結果は胸痛で救急外来（ED）を訪れた患者のトリアージに有用な可能性があると2009年Radiological Society of North America学会（RSNA 2009）で発表された。逆に自動読影で陽性であった場合にはさらに経験のある者による読影が必要であると結論付けられた。このレトロスペクティブスタディでは、救急外来を訪れ冠動脈疾患が疑われた低ー中等度リスクの患者115人に施行されたCCTA画像を、CCTAの自動ソフトウエア解析装置COR Analyzer System (Rcadia Medical Imaging)を用いて解析した。自動の解析結果と、ゴールドスタンダードと考えられる2人の専門家の読影の結果とを比較した。解析可能であった100の症例において、自動読影の陰性的中率は98%であり、つまり、COR Analyzer Systemで有意狭窄（内腔面積の＞50%の減少）がないと決定された患者の98%において専門家の読影結果と一致したことになる。この自動装置は専門家が有意狭窄を有すると診断した患者6人中5人を検出し、感度83%、特異度82%、陰性的中率92%であった。

Full Text

Physicians at Beth Israel Deaconess Medical Center, Boston reported results of a study demonstrating the potential for automated analysis of coronary CT angiography (CCTA) by Rcadia's COR Analyzer System® to assist in rapidly ruling out coronary artery stenosis in hospital emergency department (ED) patients with chest pain. The ability of the automated system to enhance the use of CCTA has potential to significantly reduce unnecessary utilization of coronary observation beds in the low to moderate probability coronary artery disease (CAD) patient. The study was presented in Chicago at the 2009 annual meeting of the Radiological Society of North America (RSNA).

"In recent years, CCTA has proven to be an effective, non-invasive procedure for coronary artery analysis," said Girish Tyagi, MD, the study's principal investigator, radiologist at the medical center and Instructor at Harvard Medical School. "However, coronary CT angiography is under-utilized in the ED because the procedure relies on expert readers who may not be immediately available during 'off hours'. In our study, we asked whether this fully automated software tool could assist in patient triage by comparing the automated results with those of expert readers."

"The results of this initial study, particularly the system's high negative predictive value of 98 percent, suggest that this automated system can be a very useful tool," he continued. "The system may provide non-expert readers with confidence to rule out significant stenosis, leading to decreased length of stay for patients in the ED and improved throughput in the ED." He added that positive results from the automated analysis require further interpretation by an expert reader.

In the retrospective study, images from CCTAs performed on 115 low to intermediate risk patients who entered the ED with suspected CAD were studied with the COR Analyzer System. The researchers compared analyses of the CCTA studies by the COR Analyzer System with the interpretation of the studies by consensus opinion of two expert readers who served as the gold standard. For 100 analyzable studies, the automated results from COR Analyzer yielded a negative predictive value of 98 percent, meaning that 98 percent of the patients determined by the COR Analyzer System to not have significant stenosis (>50 percent reduction in lumen area), were in agreement with the expert readers. The COR Analyzer System identified five of six patients determined by the expert readers to have significant stenosis, for a sensitivity of 83 percent. The specificity was 82 percent.

In addition to Dr. Tyagi, the study's authors are: Atif Khan, M.D., Faisal Khosa, M.D., Sheryar Sarwar, M.D., Maya Tyagi, Marc Camacho, M.D., and Melvin E Clouse, M.D., all of Beth Israel Deaconess Hospital, Boston.

"We have shown that the brain has the ability to regain function through rehabilitative exercises following a stroke," said A. Aria Tzika, Ph.D., director of the NMR Surgical Laboratory at Massachusetts General Hospital (MGH) and Shriners Burn Institute and assistant professor in the Department of Surgery at Harvard Medical School in Boston. "We have learned that the brain is malleable, even six months or more after a stroke, which is a longer period of time than previously thought."

Previously, it was believed that there was only a short window of three to six months following a stroke when rehabilitation could make an improvement.

"Our research is important because 65 percent of people who have a stroke affecting hand use are still unable to incorporate the affected hand into their daily activities after six months," Dr. Tzika said.
To determine if stroke rehabilitation after six months was possible, the researchers studied five right-hand dominant patients who had strokes at least six months prior that affected the left side of the brain and, consequently, use of the right hand.

For the study, the patients squeezed a special MR-compatible robotic device for an hour a day, three days per week for four weeks. fMRI exams were performed before, during, upon completion of training and after a non-training period to assess permanence of rehabilitation. fMRI measures the tiny changes in blood oxygenation level that occur when a part of the brain is active.

The results showed that rehabilitation using hand training significantly increased activation in the cortex. Furthermore, the increased cortical activation persisted in the stroke patients who had exercised during the training period but then stopped for several months.

"These findings should give hope to people who have had strokes, their families and the rehabilitative specialists who treat them," Dr. Tzika said.

Dr. Tzika is an affiliated member of the Athinoula A. Martinos Center for Biomedical Imaging in the Department of Radiology at MGH, where the research is ongoing.

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