

## CT SLICE



### SOFTWARE-BASED CHEST PAIN TRIAGE

By Annie Macios

Could the Rcadia COR Analyzer be to radiologists what CliffsNotes are to high school English students? Rcadia Medical Imaging has developed image processing-based software that provides an analysis of CT angiography (CTA) studies with accuracy similar to that of an experienced radiologist. The software utilizes CT exam images and provides automatic coronary artery segmentation from those images, explains Robert Lenkinski, PhD, vice chairman of the radiology department at Beth Israel Deaconess Medical Center in Boston.

Lenkinski says imaging is so important to trauma and assessment in the emergency department (ED) that CT scanners are staffed and available 24/7. In the past, those CTs were primarily used in EDs for stroke assessment or patients in car accidents. In recent years, CTA using 64-slice scanners has been shown to be valuable in assessing people who present in the ED with chest pain, and its use for that task is increasing. Roughly 6 million people come to the ED

for chest pain each year, Lenkinski says.

When a patient with chest pain comes to the ED, a triage nurse will generally hook them up to an electrocardiogram (EKG) monitor and draw blood for enzyme tests. If either or both are abnormal, a cardiologist is called depending on the clinical status. Many of these patients end up in a cardiac catheterization lab.

“One third of these patients who come in have no cardiac history, a normal EKG, and no elevated enzymes, so what do you do with them? You don’t send them home because enzymes peak between 12 and 14 hours after an episode. So a multi-detector CT scan is used to evaluate these patients, who are a low-risk population for heart attack. Since the negative predictive value on CT approaches 100%, if it comes out normal, that means they are almost certainly not having a heart attack. It’s not only a good test but a cost-effective test for this low-risk population,” says Lenkinski.

He adds that most patients in this situation usually come to the ED late at night, and staffing is often a problem because interpretation of the CT needs an expert—either a radiologist or a cardiologist. Often the staff on duty in an academic center ED on the late shift are residents. Rcadia’s product can help their decision-making process because it provides an automatic CT analysis and flags the results into three main categories.

“The first is normal, with no significant stenosis and nothing cardiology related causing the pain. Second, it would indicate a problem where it sees a stenosis and flags it. The third would report that it was not able to analyze the CT because of factors such as patient movement. This occurs in roughly 5% to 10% of patients, which is similar to real-life

analysis by a radiologist," says Lenkinski.

The software produces the segmentation in five minutes, enabling the resident or the physician to quickly take the next step for treatment. "The computer doesn't make the decision but presents the facts. If the CT looks suspicious, the resident can call in the appropriate experts," Lenkinski says.

### Add Value

Vinay Malhotra, MD, has worked with the Rcadia technology for more than one year at the Cardiac Study Center in Puyallup, Wash. He stresses that an automated system cannot replace human judgment. "It will not replace humans; it must simply add value by enabling physicians to improve decision making and prognosis," he says.

According to Malhotra, Rcadia simplifies workflow because it identifies the studies as normal or abnormal. "It improves workflow by enabling us to focus on the abnormal studies and therefore improve decision making regarding patient care," says Malhotra.

He adds that triage records generally indicate that 20 to 30 low- to medium-risk patients with normal EKGs present in the ED in a typical 24-hour period. "These patients fit the criteria for CT angiography, which is a very good diagnostic tool for this population. Most of these patients, however, arrive at the [ED] after normal business hours," notes Malhotra. He believes the software is a good tool that can help with triage by flagging the studies, which provides the ED physician on duty with additional information for decision making.

Based on the results, the emergency physician can then call a radiologist to immediately read the study for abnormalities and prioritize the cases that show

normal results. "This enables [ED] personnel to use their resources more effectively," adds Malhotra.

Michael Yuz, MD, cofounder of USArad.com, a privately held teleradiology company, finds Rcadia to be an asset in his work with cardiac CT. He says the Rcadia COR Analyzer II serves as a workflow solution tool that facilitates patient care and saves a tremendous amount of time in reading cardiac CTs.

"Rcadia's COR Analyzer II helps to prioritize workflow because it automatically batch processes the studies. For example, when I arrive to read the studies, it might show that seven are normal and three are abnormal. Therefore, I'd start with the three abnormal studies," says Yuz.

He also says Rcadia acts as a second pair of eyes. "Something can look normal to the human eye but might actually be abnormal, and because Rcadia automatically processes the studies and points to suspicious lesions, it can act as a second opinion," Yuz says.

He finds that perhaps the greatest benefit of using Rcadia is that it saves a significant amount of time. "The cardiac CT is a time-consuming test to read, and reimbursement is low, unfortunately," Yuz says. Using Rcadia, normal studies now take just seconds or minutes to read, and abnormal studies that previously took an hour to read can be done in under five minutes. According to Yuz, this is because of an increased confidence level and avoiding the need to use traditional cardiac CT workstations.

The bottom line in Yuz's experience is that using the software makes reading cardiac CTs more efficient and improves diagnosis and patient care. "What more can you ask for? I can't think of one disadvantage or reason not to use the system," he says.

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