Portable CT Scanner May Increase Number of Patients Who Receive Treatment for Acute Stroke: Presented at RSNA

By Charlene Laino

CHICAGO -- December 3, 2008 -- Having a portable 8-slice computed tomography (CT) head/neck scanner dedicated for use in the emergency department may help increase the number of patients eligible for thrombolytic therapy, a prospective study shows.

David B. Weinreb, MD, Department of Radiology, Hospital of Saint Raphael, New Haven, Connecticut, presented the results here on December 2 at the Radiological Society of North America (RSNA) 94th Annual Meeting. He conducted the study while at North Shore Medical Center-Salem Hospital in Salem, Massachusetts.

Almost three-quarters of the 700,000 stroke patients in the United States are treated in the emergency department every year, Dr. Weinreb said.

The only US Food and Drug Administration-approved agent for the treatment of acute ischaemic stroke is tissue-plasminogen activator (tPA). Although tPA should be administered within 3 hours of symptom onset, most patients arrive near or beyond the 3-hour deadline, he said.

As a step toward meeting the 3-hour deadline, the US National Institute of Neurological Disorders and Stroke recommends that patients with signs of acute stroke undergo CT imaging within 25 minutes of arrival in the emergency department.

Dr. Weinreb and colleague James Stahl, MD, Harvard Medical School and Massachusetts General Hospital Institute for Technology Assessment, Boston, Massachusetts, conducted a study to determine the reduction in request-to-CT time intervals when using dedicated portable CT imaging and the consequent change in number of acute stroke patients eligible for tPA.

During the month prior to the acquisition of the portable scanner and for a 4-month period following its installation, the researchers measured the time elapsed between a physician’s order for a head CT and performance of the scan for all patients on the 3:00 PM to 11:00 PM shift. They then used computer simulation to compare the likelihood of tPA administration after using the portable CT
system and the conventional CT imaging.

Results showed that request-to-scan times decreased from 39 to 16 minutes after the introduction of portable CT imaging ($P < .001$). The percentage of patients who underwent a scan within 25 minutes increased from 43% to 81%.

Based on simulation modelling, the researchers estimated that this improvement would increase by 86% the number of stroke patients able to be treated with thrombolytic therapy within the 3-hour window, from 0.59% (about 1 in 170 patients) to 1.1% (about 1 in 91 patients).

“This was a very mathematically robust finding,” Dr. Weinreb said. "Eligibility for tPA was not affected by increases in the number of emergency department physicians, neuroradiologists, neurologists, or conventional CT scanners.”

According to Dr. Weinreb, most stroke patients are taken to relatively small community hospitals where access to CT scanning may be limited. When a CT scanner is available, it is not always in proximity to the emergency department, making transportation of critically ill patients to the radiology department both difficult and time consuming.

“A portable 8-slice CT can be easily added and used to accurately identify a head bleed in a stroke or trauma patient,” he said. "Having this new technology will make it possible for more patients to receive tPA.”

[Presentation title: The Introduction of a Portable Head/Neck CT Scanner May Be Associated With an 86% Increase in the Predicted Percent of Acute Stroke Patients Treatable With Thrombolytic Therapy. Abstract SSJ07-02]