ポータブルCTにより脳卒中後の生存の可能性が高くなる

救急治療室でのポータブルCTスキャンにより虚血性脳卒中の診断および治療が速まる

Portable CT scanner in the emergency room speeds diagnosis and treatment of ischemic stroke

救急治療室において ポータブル8スライスコンピュータ断層撮影（CT）が使用可能となることにより、虚血性脳卒中の診断および治療までの時間が有意に短縮できるとRadiological Society of North America（RSNA）学会で発表された。研究者らは、ポータブルCTスキャン使用前に脳卒中の徴候で来院した患者127人とポータブルCTスキャンが使用可能になった後に同様の症状で来院した患者281人の予後を比較した。ポータブルCTスキャンが使用可能となる前は、患者はCTスキャンのために他の建物に移動しなくてはならなかった。救急治療室でCTスキャンが使用可能になったことで、検査オーダーから検査までの時間が34.55分（±2.2分）から15.88分（±2.4分）へと54%短縮した（p<0.001）。シミュレーションモデルに基づき研究者らは、この改善により発症から3時間以内に血栓溶解療法を受けられる患者の数が86%増加するであろうと推測している。

Full Text

New research has found that the availability of a portable eight-slice computed tomography (CT) scanner can significantly reduce the time to diagnosis of ischemic stroke for patients presenting to the emergency room. Results of the study, conducted at North Shore Medical Center (NSMC)-Salem Hospital in Salem, Mass., were presented at the annual meeting of the Radiological Society of North America (RSNA).

"The hospital's acquisition of a portable CT scanner facilitated more rapid assessment of acute stroke patients and is anticipated to increase the number of patients to whom thrombolytic therapy can be administered," said the study's lead author, David B. Weinreb, M.D., now a resident physician in the Department of Radiology at Hospital of Saint Raphael in New Haven, Conn.

Ischemic strokes can be treated with thrombolytic therapy to dissolve the blockage. However, the window of opportunity to safely administer the medication is generally considered to be just three hours.

"tPA is usually the only shot we have at clot-induced ischemic strokes," Dr. Weinreb said. "But it needs to be administered in a closely monitored situation, because the drug can have extremely adverse effects in those patients whose strokes are instead due to bleeds." Before a patient receives tPA, a head CT must be performed to ensure there is no bleeding in the brain. The National Institute of Neurological Disorders and Stroke recommends that patients who arrive in the emergency room (ER) with signs of acute stroke undergo CT imaging within 25 minutes.

For the study, Dr. Weinreb and colleagues began using a portable CT scanner to assess stroke patients in the emergency room (ER) of NSMC-Salem Hospital. During the month prior to the acquisition of the portable scanner and for a four-month period following its installation, researchers measured how much time elapsed between a physician order for a head CT and performance of the scan.

The availability of the CT scanner in the hospital's emergency room reduced the time between the order and exam from 34.55 minutes (±2.2 minutes) to 15.88 minutes (±2.4 minutes), a reduction of 54 percent (p<0.001). Based on simulation modeling, the researchers estimated that this improvement would increase the number of stroke patients able to be treated with thrombolytic therapy within the three-hour window by 86 percent.

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 ER, making transportation of critically ill patients to the radiology department both difficult and time-consuming.

"A portable eight-slice CT can be easily added and used to accurately identify a head bleed in a stroke or trauma patient," Dr. Weinreb said. "This new technology is able to solve a very important problem for a community hospital, where the majority of stroke victims are being treated."

Co-author is James E. Stahl, M.D.

"For patients with major depression and other stress-related disorders, traumatic memories are a source of anxiety," said Nivedita Agarwal, M.D., radiology resident at the University of Udine in Italy, where the study is being conducted, and research fellow at the Brain Imaging Center of McLean Hospital, Department of Psychiatry at Harvard Medical School in Boston. "Because traumatic memories are not adequately suppressed by the brain, they continue to interfere with the patient's life."

Dr. Agarwal and colleagues used brain fMRI to explore alterations in the neural circuitry that links the prefrontal cortex to the hippocampus, while study participants performed a memory task. Participants included 11 patients with major depression, 13 with generalized anxiety disorder, nine with panic attack disorders, five with borderline personality disorder and 21 healthy individuals. All patients reported suffering varying degrees of stressful traumatic events, such as sexual or physical abuse, difficult relationships or "mobbing" - a type of bullying or harassment - at some point in their lives.

After reviewing a list of neutral word pairs, each participant underwent fMRI. During imaging, they were presented with one of the words and asked to either recall or to suppress the memory of its associated word.

The fMRI images revealed that the prefrontal cortex, which controls the suppression and retrieval of memories processed by the hippocampus, showed abnormal activation in the patients with stress-related disorders compared to the healthy controls. During the memory suppression phase of the test, patients with stress-related disorders showed greater activation in the hippocampus, suggesting that insufficient activation of the prefrontal cortex could be the basis for inadequate suppression of unwanted traumatic memories stored in the hippocampus.

"These data suggest that the mechanism for memory suppression is dysfunctional in patients with stress-related disorders primarily because of an alteration of the prefrontal cortex," Dr. Agarwal said. "These patients often complain of poor memory, which might in part be attributed to this altered circuitry," she added.

According to Dr. Agarwal, fMRI is an important tool in understanding the neurobiological basis of psychiatric disorders and in identifying imaging markers to psychiatric disease, helping clinicians target specific parts of the brain for treatment.

The study's principal investigator is Paolo Brambilla, M.D., Ph.D. Co-authors are Monica Baiano, M.D., Ph.D., Massimo Bazzocchi, M.D., Giuseppe Como, M.D., and Marta Maieron, Ph.D.