
RSNA Press Release

Using CT, Radiologists Can Pinpoint Cause of Some Strokes

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OAK BROOK, Ill. — Multidetector computed tomography (CT) helps pinpoint the causes of ischemic strokes, the most common type of stroke, potentially speeding the delivery of life-saving treatments, according to a study published online and in the January issue of *Radiology*.

At A Glance

- Multidetector CT helps to quickly identify the cause of an ischemic stroke, which is essential for preventing future strokes.
- An ischemic stroke occurs when blockage in an artery interrupts blood flow to an area of the brain.
- Ischemic stroke accounts for 87 percent of all stroke cases.
- Multidetector CT is quick and well tolerated by patients.

"Our results suggest that multidetector CT could become the first-line imaging tool for identifying the cause of acute ischemic stroke," said the study's lead author, Loic Boussel, M.D., Ph.D., professor of radiology at Louis Pradel Hospital in Bron, France.

An ischemic stroke occurs when blockage in an artery, often from a blood clot or a fatty deposit due to atherosclerosis, interrupts blood flow to an area of the brain. This type of stroke can originate in the heart, in the form of a blood clot that travels to the head, or from blood vessels in the neck (extracranial carotid arteries) and head (intracranial arteries). According to the American Stroke Association, ischemic stroke accounts for approximately 87 percent of stroke cases.

Early determination of the cause of ischemic stroke is essential for secondary stroke prevention. Anticoagulant therapy to thin the blood is the treatment of choice for most of the cardiac sources of stroke, while surgery is needed for strokes caused by severe narrowing of the extracranial carotid artery.

Physicians use a combined imaging protocol to determine the cause of an ischemic stroke. The protocol typically includes duplex ultrasonography, MR angiography or CT angiography of the neck and brain vessels, and transthoracic and transesophageal echocardiography.

"This approach is time-consuming and expensive, and could delay secondary stroke prevention strategies," Dr. Boussel said.

In the new study, Dr. Boussel and colleagues analyzed the potential of multidetector CT as a

faster and more cost-effective way to detect the main causes of ischemic stroke. The researchers compared a single-session multidetector CT examination of the heart, neck and brain vessels with established imaging methods in 46 patients who had recently experienced an ischemic stroke.

Almost half of the stroke cases had cardiac sources, while 20 percent of cases were caused by major arterial atherosclerosis.

Multidetector CT detected cardiac sources of stroke in 18 of 25 cases, for a sensitivity of 72 percent. The technique's sensitivity increased to 100 percent for detection of major arterial atherosclerosis. Overall, multidetector CT facilitated stroke classification in 38 of the 46 patients, or 83 percent.

"CT allows a fast diagnosis and helps to identify the cause of the stroke during a single examination," Dr. Bussel said. "Moreover, because it is quick, the exam is well tolerated, which is critical in acute stroke patients who may be unstable and agitated."

The CT protocol has two main limitations, according to Dr. Bussel. It exposes the patient to a significant radiation dose and requires two intravenous contrast material injections to study the chest and neck areas. Dr. Bussel said that advances in CT equipment technology could help reduce the radiation dose and the total amount of iodinated contrast material required.

Larger studies are needed to validate the results and to analyze the technique's cost-effectiveness.

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"Ischemic Stroke: Etiologic Work-up with Multidetector CT of Heart and Extra- and Intracranial Arteries." Collaborating with Dr. Bussel were Serkan Cakmak, M.D., Max Wintermark, M.D., Ph.D., Norbert Nighoghossian, M.D., Ph.D., Romaric Loffroy, M.D., Philippe Coulon, Ph.D., Laurent Derex, M.D., Ph.D., Tae Hee Cho, M.D., and Philippe C. Douek, M.D., Ph.D.

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