

# Alternative test better at finding potentially dangerous holes in the heart

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An alternative test for measuring blood flow to the brain detected a potentially dangerous hole within the heart of some patients with an unexplained stroke better than a standard test, according to late-breaking science presented at the American Stroke Association's International Stroke Conference 2014.

In addition, the transcranial Doppler test could differentiate the risk of future [stroke](#) or transient ischemic attack (TIA) as related to the severity of the defect.

An echocardiogram uses ultrasound to see if bubbles injected in a vein have flowed from the right side of the heart to the left side (through the top chambers of the heart called the atria), while the transcranial Doppler detects the bubbles in the brain arteries, said J. David Spence, M.D., senior researcher for the study and director of the Stroke Prevention & Atherosclerosis Research Centre, Robarts Research Institute at Western University in London, Ontario, Canada.

Previous research indicates that 25 percent of the population, and a higher percentage of patients who have had unexplained strokes, have a patent foramen ovale (PFO), which occurs when an opening between two heart chambers fails to close at birth. Many people never have symptoms. However, such a hole, or "shunt," can allow a blood clot that forms in a vein to escape from the right to the left side of the heart, enter the arteries to the brain and cause a stroke (paradoxical embolism).

Researchers tested whether PFOs already detected by transcranial Doppler would also be found by transesophageal echocardiography, a widely used approach.

Echocardiography—which included contrast dye before saline bubbles were injected—failed to find the PFO in more than 15 percent of the 340 patients in the study with the defect, the researchers reported.

Researchers did not investigate whether transcranial doppler detected all such defects in patients with PFO found by echocardiogram.

"Surprisingly, some of those shunts were quite large," Spence said—about one-quarter of the missed defects were in the three highest grades of severity, according to a five-grade measure.

Accurately detecting PFOs, and knowing its grade, can help doctors decide whether a stroke was due to a paradoxical embolism, Spence said. Other clues related to the patient's stroke are also helpful, including shortness of breath at stroke onset; sitting for a long time, such as on an airplane; waking up with a stroke; and having a history of migraine, sleep apnea, deep vein thrombosis, varicose veins or pulmonary embolism.

Diagnosing the underlying cause of a stroke is essential to choosing the right medicine to help prevent future strokes, Spence said. Anticoagulant drugs are three times more effective than another commonly used class of drugs, known as antiplatelet agents, in preventing the type of stroke that can be caused by a clot passing through a PFO, he said.

The study's findings may also be important in understanding which patients with PFO might benefit from closing the hole surgically or with a catheter-deployed device. PFO is present in about one-quarter of the population but accounts for only about 5.5 percent of strokes caused by paradoxical embolism. This suggests the defect isn't a problem in about

80 percent of patients with it, Spence said. "That's why these clinical clues are so important," he said.

Compared with echocardiography, the cost of transcranial doppler equipment is about one-fifth that of a modern echocardiogram machine; heavy sedation is not used as it typically is with transesophageal [echocardiogram](#); and transcranial Doppler is helpful for other purposes, such as learning which [patients](#) with asymptomatic narrowing of the carotid artery may warrant surgery. "More stroke centers should be doing transcranial Doppler," Spence said.

Provided by American Heart Association

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