

Section Editors

David C. Spencer, MD
Steven Karceski, MD

The SVD score

A simpler way to assess stroke?

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In their article “Stroke subtype, vascular risk factors, and total MRI brain small-vessel disease burden,” Dr. Staals and colleagues¹ at the University of Edinburgh (Scotland) looked at a new way of assessing strokes. Their goal was to see whether they could design a simpler way to use MRI in the evaluation of certain kinds of stroke.

THERE ARE DIFFERENT KINDS OF STROKE Strokes can have many different causes. When a stroke occurs, a part of the brain is not getting enough oxygen. One way in which a stroke occurs is when an artery, the blood vessel that brings oxygen-rich blood to our internal organs, becomes blocked. Sometimes this occurs very gradually: one example is atherosclerosis, also called “hardening of the arteries.” Other times the blockage occurs very quickly, such as when a blood clot travels through the artery and becomes lodged in one of its branches. Another type of stroke called small-vessel disease (SVD) affects the very small arteries, called arterioles.

Damage to the arterioles results in very small strokes. Because such a small region of brain is affected, a person may not be aware that the injury is occurring. However, over a long period of time, as injury to these small vessels accumulates, a person may begin to experience neurologic problems. For some people, memory problems occur. Others may experience trouble with strength, balance, walking, clarity of thinking, or attention.

Injury to the arterioles most often occurs due to high blood pressure and diabetes. Since the injury to the arterioles occurs over a long period of time, medical treatments may help. Studies have shown that preventing or treating the cause of SVD reduces the risk of this type of stroke.

When a person has strokes due to SVD, the MRI may show this. There are several ways that SVD appears on MRI. The first is a pattern of white matter hyperintensities (WMHs). These accumulate over time as the injury worsens. Once healing has occurred, the person may have lacunes on MRI: these are evidence that a small stroke has occurred sometime in the past. There is a very small space around each blood vessel as it makes its way through the brain. As injury to the arterioles worsens, these spaces, called perivascular spaces (PVS), become larger and can be seen on MRI. Finally, some people with

SVD will experience small areas of bleeding, called microhemorrhages or cerebral microbleeds (CMBs). These also show up on MRI.

HOW WAS THE STUDY CONDUCTED? Dr. Staals and colleagues proposed the use of a system of scoring the MRI. A person with SVD may experience only one type of change on his or her MRI. However, many people have more than one type of brain injury due to the SVD. For instance, some people may have WMHs and CMBs. The authors proposed an overall score as a better way to measure the total effect that these small strokes have on a person’s MRI. The overall score is called the “SVD score,” which has a range of 0–4. They proposed that the SVD score might be a better measure of overall brain injury.

In order to test their idea, they used the SVD score in the evaluation of 461 patients who had experienced a stroke. The patients had been enrolled in 2 prior stroke trials. One of the trials had occurred in 2003–2007, the other in 2010–2012. In these trials, patients had experienced a mild stroke and had gone to the hospital in Edinburgh for an evaluation within 3 months of the stroke.

Dr. Staals and colleagues evaluated the risk factors for stroke. They assessed whether the person was a smoker and whether he or she had high blood pressure, diabetes, high cholesterol, prior heart attack, or other problems with blood vessels like peripheral vascular disease. Next, they assessed the MRIs of these individuals. They looked for the patterns of injury due to SVD. They had a very careful system of scoring each of these patterns, and they added the points to give a “total SVD score” that ranged from 0 to 4.

THE RESULTS The 461 patients had an average age of 68 years. Almost two-thirds (65%) had high blood pressure. Thirteen percent had diabetes. One-third (33%) were smokers, and almost one-half (46%) had high cholesterol. Of the people who had just one of the patterns of SVD on MRI, the most common pattern was enlarged PVS (45%). After this, 29% had WMHs, 15% had lacunes, and 11% had microhemorrhages.

The SVD score was closely related to several risk factors for stroke. The first was age, followed by male sex, having problems with other blood vessels

(peripheral vascular disease), and high blood pressure. There was no clear association between the SVD score and diabetes, high cholesterol, or a prior history of heart attack.

WHAT DO THE RESULTS MEAN? The authors observed that the SVD score is simple and easy to use. When using this score to evaluate a group of people who had recently had a stroke, it seems to correlate well with certain risk factors (for stroke) as well as overall brain injury. There are several possible applications of the SVD score, including in stroke research. If more carefully studied, the SVD score could be a simple, useful way of evaluating MRIs in people with recent

stroke. For example, a person has a small stroke and goes to the emergency department. An MRI is done. The SVD score is calculated as a measure of brain injury. If stroke prevention or treatment was started, the score could then be used to monitor patients over time to determine how they are responding to the medical intervention. Of course, further study is needed to validate these results.

REFERENCE

1. Staals J, Makin SDJ, Doubal FN, Dennis MS, Wardlaw JM. Stroke subtype, vascular risk factors, and total MRI brain small-vessel disease burden. *Neurology* 2014;83:1228–1234.

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About stroke

WHAT IS A STROKE? A stroke is caused by the sudden loss of blood flow to the brain or bleeding in and around the brain. Just as a heart attack causes heart cells to die, a stroke, also called a “brain attack,” causes brain cells to die. Damage to the brain causes paralysis, speech problems, memory difficulties, and problems with thinking and attention. Stroke is also the fourth leading cause of death and the most common cause of disability in people living in the United States¹. Fortunately, there are effective ways to prevent stroke. If you have a stroke, seeking immediate medical attention can help reduce your chances of death and disability.

WHAT ARE THE WARNING SIGNS OF STROKE?

The American Stroke Association Web site (www.strokeassociation.org) has a wealth of information about stroke and stroke prevention, including videos on how to recognize the warning signs of stroke. They have developed F-A-S-T, a quick and easy way to remember the warning signs of stroke²:

F = Face drooping—Does one side of the face droop or is it numb? Ask the person to smile. Is the person’s smile uneven?

A = Arm weakness—Is one arm weak or numb? Ask the person to raise both arms. Does one arm drift downward?

S = Speech difficulty—Is speech slurred? Is the person unable to speak or hard to understand? Ask the person to repeat a simple sentence, like “The sky is blue.” Is the sentence repeated correctly?

T = Time to call 9-1-1—If someone shows any of these symptoms, even if the symptoms go away, call 9-1-1 and get the person to the hospital immediately. Check the time so you’ll know when the first symptoms appeared.

SOME RISK FACTORS FOR STROKE CAN BE PREVENTED OR TREATED

- High blood pressure
- Irregular heartbeat (atrial fibrillation is the most common irregular heartbeat associated with stroke)
- Diabetes (high blood sugar)
- Cigarette smoking
- High cholesterol (high levels of cholesterol in the blood)
- Obesity

HOW ARE STROKES TREATED? Part of the answer depends on the kind of stroke a person has. However, immediate medical care is critical in the treatment of stroke because certain treatments can only be given within a few hours of the stroke. After that time, the treatment may no longer be helpful and can be dangerous. In other words, time is of the essence.

HOW IS STROKE PREVENTED? Some risk factors—age, sex, race, and a history of stroke in the family—cannot be changed. However, many others can be controlled. Most controllable risk factors relate to the health of the blood vessels. The following can help prevent stroke:

- Having regular medical checkups
- Controlling high blood pressure
- Not smoking or stopping if you do
- Treating heart disease and an irregular heartbeat, if present
- Improving diet, such as avoiding excess fat or cholesterol, salt, and alcohol
- Exercising regularly
- Controlling diabetes

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Neurology Now[®]

<http://journals.lww.com/neurologynow/Pages/Resource-Central.aspx>

American Stroke Association
www.strokeassociation.org

National Stroke Association
www.stroke.org

National Institute of Neurological Disorders and Stroke
<http://stroke.nih.gov>

REFERENCES

1. About stroke. American Stroke Association Web site. Available at: http://www.strokeassociation.org/STROKEORG/AboutStroke/About-Stroke_UCM_308529_SubHomePage.jsp. Accessed August 19, 2014.
2. Stroke warning signs and symptoms. American Stroke Association Web site. Available at: http://www.strokeassociation.org/STROKEORG/WarningSigns/Stroke-Warning-Signs-and-Symptoms_UCM_308528_SubHomePage.jsp. Accessed August 19, 2014.

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