

# Spotting Strokes

Blood-protein “fingerprints” may help identify strokes faster than ever before.

BY CHARLENE LAINO

**D**iagnosing a stroke is difficult because the symptoms—weakness in an arm or leg, slurred speech, confusion, severe headache, trouble seeing—mimic those of many other conditions. But new tests that look for proteins in the blood that are elevated during a so-called “brain attack” may help doctors determine if a person is having a stroke much more quickly than they can now.

“Our goal is to have a panel of markers that quickly tell us whether a patient with symptoms that look like a stroke is really having a stroke, or whether it is a seizure or some other disorder,” says Edward C. Jauch, M.D., assistant professor of Emergency Medicine and faculty of the Greater Cincinnati/Northern Kentucky Stroke team in Cincinnati.

When it comes to stroke, prompt diagnosis is vital. The only drug available for the treatment of ischemic strokes is a clot-buster called tissue plasminogen activator, and it has to be given within three hours of symptom onset. Ischemic strokes, which are the most common type of stroke, occur when blood flow to an area of the brain is compromised by a blood clot. This leads to the death of brain cells and brain damage.

## WANTED: ISCHEMIC STROKE TEST

If a stroke victim calls an ambulance and gets to the hospital, computed tomography (CT) scans are effective at spot-



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ting hemorrhagic strokes, notes Duke University neurologist Daniel T. Laskowitz, M.D. But hemorrhagic strokes, which are caused by bleeding into the brain, are less common than ischemic strokes—and brain images are far less reliable at picking up the early stages of ischemic strokes.

“Right now, there is no test to help ‘rule in’ an ischemic stroke,” Dr. Laskowitz says. As a result, only about half of stroke victims who get to the hospital in time and could benefit from tissue plasminogen activator actually gets the drug.

While a test for a blood protein known as troponin has already proven inval-

able in distinguishing heart attacks from other conditions in the first critical hours after symptoms strike, developing a test for stroke has proven much more difficult.

That’s because the brain is vastly more complex than the heart, explains Dr. Jauch. “There’s a different response to injury, so one can’t make a simple translation from heart disease to brain disease. No single marker has sufficiently high accuracy in the early hours after stroke onset, when the test has the greatest ability to affect care.”

Take the blood protein D-dimer, for example. This protein is elevated whenever a blood clot forms in the body, so it could signal an ischemic stroke. But levels of D-dimer also shoot up if there is a blood clot in the lungs or legs.

## 15 MINUTES TO DIAGNOSIS

That complexity has led researchers to pursue panels of blood proteins—what doctors call biomarkers—rather than a single biomarker for use as aids in the rapid assessment and diagnosis of stroke. One such test, Biosite Inc.’s Triage Stroke Panel, simultaneously measures four blood proteins that are elevated during an ischemic stroke: D-dimer, matrix metalloproteinase-9 (MMP-9), S100-beta, and brain natriuretic peptide (BNP). Results are available in 15 minutes.

“D-dimer tells us a blood clot is present somewhere in the body, and MMP-9 tells us that there is blood/brain injury. S100-beta is almost exclusive to the brain. BNP, for reasons that are not completely clear, is elevated during stroke,” Dr. Jauch explains.

"When used in conjunction, these four proteins provide complementary information in the diagnosis of stroke."

Dr. Laskowitz led testing of Biosite's four-marker panel on nearly 1,200 people who had symptoms suggestive of a stroke. When used in conjunction with a CT scan, the blood test helped to accurately identify more than 90 percent of those who were actually having a stroke. In contrast, a CT scan alone was only about 50 percent accurate.

The panel is already approved for use in the European Union, but the U.S. Food and Drug Administration wants to see further research before approving the test here.

#### A RICH SOURCE OF CLUES

Biomarkers may also help to tell how quickly a stroke is progressing. In one study published last year, British researchers found that testing for elevated levels of D-dimer helped to identify

stroke victims whose symptoms quickly deteriorated. If the research pans out, stroke victims with elevated D-dimer levels could be targeted for aggressive therapy, they say.

Eventually, biomarkers might prove useful not just in diagnosing stroke, but in preventing stroke and telling doctors the age of a stroke, says James C. Grotta, M.D., professor of neurology and director of the stroke program at the University of Texas Health Science Center at Houston.

"Biomarkers are fingerprints, and we're just starting to figure out their usefulness," he says. "In the future, we could have biomarkers that tell us if a patient is a good candidate for clot-busters, aspirin, or some other therapy. The field is in substantial development." 

*Charlene Laino is a health and science journalist who has written for Reuters, WebMD, and msnbc.com.*

## STROKE 911

If you suspect that someone is having a stroke, call 911 immediately. Then perform a quick test to confirm that a possible stroke is under way. Ask the person to smile big, hold her hands out in front of her, close her eyes, and repeat a familiar phrase such as "You can't teach an old dog new tricks."

#### THE PERSON MIGHT BE HAVING A STROKE IF:

- ▶ Her smile is suddenly lopsided or one side of her face doesn't move.
- ▶ She can't raise one of her arms or one of her arms seems to be sagging down.
- ▶ She can't speak, she slurs her words, or she badly confuses words.

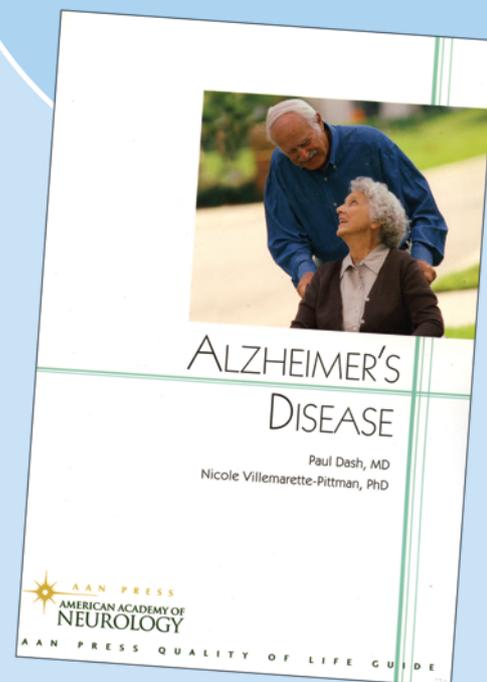
#### TO REMEMBER THIS TEST, REMEMBER "FAST":

- ▶ FACE ▶ ARM ▶ SPEECH ▶ TIME TO CALL 911.

Since treatment must be administered within three hours of a stroke to be effective, experts recommend practicing what to say to the 911 operator. "I think my husband is having a stroke" is more effective than "I think something is wrong with my husband." You should also tell the 911 operator what the symptoms are and how long the person has had them.

Source: Stroke Awareness Foundation ([strokeinfo.org](http://strokeinfo.org); 408-879-8433)

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