

# Striking Fast

Stroke treatments can minimize damage, but only if started quickly

BY TOM VALEO

**R**emarkable treatments have been developed for the three most common forms of stroke. Some people who once would have died from their stroke now survive. Some who would have been paralyzed and seriously disabled now walk out of the hospital with no brain damage at all.

To be effective, however, all three treatments must be administered within three or four hours after the first symptoms appear.

Unfortunately, people often don't get to the hospital in time, and few hospitals have the necessary equipment or the trained staff to respond that fast with these treatments. Where you end up after having a stroke may determine whether you survive, or how disabled you will be.

## ISCHEMIC STROKE

The most common form of stroke, an ischemic stroke, results from a blood clot that blocks an artery supplying blood to the brain. Within a few minutes, brain cells will start to malfunction. The symptoms depend on which part of the brain is starved for oxygen, but the most common signs include tingling or numbness on one side of the body, paralysis, speech difficulties, dizziness, confusion or difficulty seeing.

Even with the supply of oxygen cut off, neurons do not die immediately. If the stroke victim promptly receives a "clot buster" to dissolve the blockage, blood flow will be restored and many of the neurons will survive, performing just as efficiently as ever.

The clot buster, known as tissue plasminogen activator (tPA), is the only drug approved by the Food and Drug Administration for immediate treatment of ischemic stroke. And the sooner a stroke victim receives it, the better the outcome.

So why don't paramedics administer



tPA to the stroke victim on the way to the hospital? Because if tPA is administered to a person who is having a hemorrhagic stroke caused by bleeding in the brain, the drug will make the bleeding worse.

Since the two types of stroke tend to produce similar symptoms, tPA must wait until the patient gets to the hospital and has a CT scan of the brain, which will determine if the stroke is caused by a clot or by bleeding. Further delay may result if no one in the emergency room feels qualified to read the CT scan.

"A lot of doctors don't want that kind of responsibility," says Stephan A. Mayer, M.D., director of the Neuro-Intensive Care Unit at New York Presbyterian Hospital. "This treatment [tPA] can be lifesaving for an ischemic stroke, but it can be life-threatening if given to someone whose brain is bleeding, so emergency room doctors will say, 'Call neurology,' but a neurologist may not be on call. So 10 years after its approval,

only 4 percent of [ischemic stroke] patients are getting tPA."

Such dismal performance was underscored in a recent study of 52 strokes that occurred in the hospital: 17 of those patients were eligible for tPA—but none of them got the drug.

"For the patients eligible for tPA therapy, failure to call the stroke team and to perform needed evaluations within the three-hour time window was the most common reason tPA was not administered," says Ziad El-Zammar, M.D., of the State University of New York Upstate Medical Center in Syracuse, where the study was conducted. "We have a stroke team on duty here 24-7, yet we had these results."

## HEMORRHAGIC STROKE

The problem is even greater with people who have a brain bleed, known as a hemorrhagic stroke. While only 10 percent to 15 percent of strokes are caused



**Speed saves:**  
It is urgent to treat stroke within three or four hours after the first symptoms.

drug's effectiveness depends on how quickly you get it into the patient."

#### **CARDIAC ARREST**

Even more damaging than hemorrhagic stroke is cardiac arrest, which often results in massive brain damage. This problem is becoming more prevalent now that so many people are being resuscitated with portable defibrillators, which restore a normal heartbeat by delivering an electric shock to the chest.

Restoring a heartbeat may take several minutes, however, and in that time neurons may start to die. After just 10 or 15 minutes, permanent brain damage may be so severe that the patient will end up in a persistent vegetative state. Terri Schiavo, who was the focus of a legal battle over the right to die, remained in such a state for 15 years after a cardiac arrest, until her feeding tube was withdrawn last year and she died.

Such brain damage comes in two waves. The first takes place while the heart is stopped and blood stops flowing, depriving neurons of the oxygen they need to live. The second begins when the heart starts beating again, sending a rush of blood to the brain. This sets off a series of chemical reactions that can continue for up to 24 hours, triggering severe inflammation that damages surviving neurons.

Now two major studies have determined that people who have suffered a prolonged cardiac arrest have less brain damage if their bodies are cooled as soon as possible after the heartbeat is restored. The body temperature is lowered to between 89.6°F and 93.2°F for 12 to 24 hours. In one study, body temperature was reduced by putting the patient on a special cooling mattress with

a cover that blew cold air over the body, but ice bags work too.

"The equipment is not very expensive, but hypothermia is labor intensive," says Mary Ann Peberdy, M.D., associate professor of internal medicine and emergency medicine at Virginia

Commonwealth University, who co-authored a 2006 study on hypothermia after cardiac arrest. "These are very sick and unstable patients who require a lot of nursing care anyway, so bringing down their temperature requires a very strict protocol."

She called the study results "incredible." Patients died half as often as those who were not cooled, and the neurological outcomes were much better. The American Heart Association was so impressed with the data from this and other studies that it rushed through an interim guideline urging hospitals to adopt this treatment, but three years later only about 2 percent offer it.

"It's a novel therapy, and sometimes healthcare providers are a bit shy about doing things they're not comfortable with," says Dr. Peberdy. "That may be one reason why it has been slow to catch on."

This past December, however, the American Heart Association issued official guidelines encouraging the use of hypothermia after cardiac arrest. "Now," Dr. Peberdy says, "there's an incredible interest in hypothermia." NN

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**For more information about stroke, see RESOURCE CENTRAL on page 46.**

by a burst blood vessel, the results tend to be far worse than an ischemic stroke. Over 60 percent of people who have a hemorrhagic stroke die within a year.

When an artery in the brain ruptures, blood floods brain tissue, shocking the neurons and eventually causing their death. The best treatment is to stop the bleeding as quickly as possible, but until recently there was no way to do that.

Now a treatment known as recombinant activated factor VII (Novo-7) has been shown to reduce bleeding significantly if administered shortly after the bleeding begins.

"It's a coagulator that stops the bleeding, and our preliminary results show a 40 percent mortality reduction," says Dr. Mayer, who's conducting a study on the drug, which costs up to \$6,000 and is not yet widely used for hemorrhagic stroke. "Patients receiving the drug had about half as much bleeding in the brain as those getting the placebo. But the