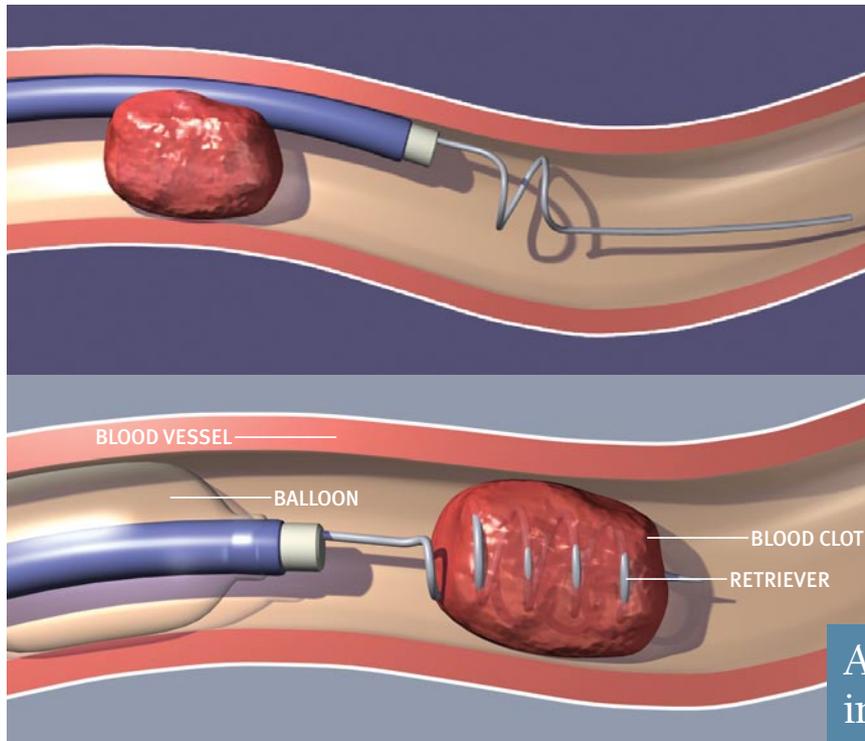




# Clearing the Way

Innovative new stroke treatments remove clots in the brain.

BY STEPHANIE STEPHENS



Gertrude Pepp can't remember the stroke she suffered in 2005 at the age of 93, only that the delicate procedure she underwent left her with no discernable disability. Now 95, she describes the experience as "a miracle." She was treated by David S. Liebeskind, M.D. and his colleagues at the University of California at Los Angeles (UCLA) Stroke Center. Dr. Liebeskind is associate professor of neurology as well as neurology director of stroke imaging and associate neurology director of the UCLA Stroke Center.

Pepp suffered a middle artery cerebral occlusion—a clot—and was paralyzed on her right side, with no language capabilities. But "she dramatically improved on the table," recalls Dr. Liebeskind, who performed a procedure on her called a mechanical thrombectomy, using a device designed to retrieve and break up clots.

Now, Pepp says, "I keep busy with

reading, playing cards, going to lunch, and visiting my family."

No treatment can cure a stroke, but treatment advances can write fairytale endings such as Pepp's. She is one of 4.7 million stroke survivors in the United States, where stroke remains the third leading cause of death, behind heart disease and cancer. Stroke is also the leading cause of serious, long-term disability. On average, someone in the U.S. suffers a stroke every 45 seconds.

## CIRCULATION, INTERRUPTED

An ischemic stroke (or "brain attack") is a sudden interruption in blood supply that prevents brain cells from receiving essential nutrients and oxygen. As a result, the cells stop functioning and may even die.

These most common strokes are usually caused by an abrupt blockage of arteries leading to the brain. Stenosis,

for example, is a blockage or narrowing of arteries in the neck or head typically caused by atherosclerosis, which is the fatty buildup of plaque that can result from cholesterol accumulation. Clots can then form, decreasing blood flow to the brain and causing a stroke. A clot from elsewhere in the body, often the heart, can also dislodge and become stuck in arteries feeding the brain, causing what is known as an embolic stroke.

## WEIGHING THE OPTIONS

Even before a stroke occurs, people should do their homework and identify qualified treatment locations and specialists, says Robert J. Adams, M. D., professor of neuroscience and director of the Medical University of South Carolina Stroke Center.

Dr. Liebeskind emphasizes that "it's the hand behind the device that counts. If you give two different skilled physicians the same device, they may use it differently, just as they would a scalpel."

In an acute stroke setting (or shortly after the onset of symptoms), a device such as The Merci

Retriever System (manufactured by Concentric Medical, Inc. and pioneered at the UCLA Stroke Center) may be used to retrieve or even macerate—break up—the clot, which "can be incredibly small," Dr. Liebeskind says. The intent is to remove the clot in one piece, or in large pieces, and quickly restore blood flow to the deprived area without damaging adjoining blood vessels. Used successfully on Pepp, the Merci system has proven an alternative approach for those who have failed intravenous (IV) clot-dissolving drug therapy or who cannot be treated within the three-hour limit established for IV drug administration.

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Given intravenously, tissue plasminogen activator (tPA) Activase or Alteplase—the FDA-approved thrombolytic or clot-dissolving drug—does carry a risk of bleeding in the brain, but its benefits outweigh risks when correctly administered, Dr. Liebeskind says. His colleagues at UCLA, Jeffrey L. Saver, M.D. and Banafsheh Yafeh, M.D., recently completed analyses that confirm a beneficial treatment effect of intravenous tPA.

As for other medical therapies, “scores of new drugs have undergone investigational trials without advancing to the clinical arena,” Dr. Liebeskind says. Development of a potential new drug, NXY-059, which is a nitroxide-based free radical trapping agent, ended in mid-2007 after negative second-trial results.

However, the alternative provided by mechanical thrombectomy is not without risk or controversy. The risk is that the procedure “could send debris ‘downstream’ to areas of the brain no longer reachable, causing a potentially worse situation if those clots are not retrievable,” Dr. Liebeskind says. And the controversy? “It is not proven to make patients better at the standard National Institutes of Health stroke scale ‘day 90’ evaluation marker in terms of neurological symptoms,” Dr. Liebeskind says, “though its technical efficacy in opening blocked arteries has been proven.” Recently, the company announced that it had obtained U.S. regulatory clearance for its newest Merci L6 Retriever, targeted at larger vessels.

#### DEVICE ADVICE

“Time lost is brain lost,” stroke specialists say. Every minute a stroke victim waits, hoping symptoms will subside, nearly 2 million brain cells

are lost. In ischemic stroke, “clot-dissolving medications are still the mainstay to treat patients within a very narrow time period,” says Dr. Liebeskind, who also uses CT or MRI scans to help pinpoint problems more quickly and accurately. “Imaging adds a new dimension and may extend the period during which aggressive treatments can be used later in carefully selected patients.” He adds, “It’s not the clot that causes damage, necessarily; it’s the lack of blood flow.”

Enter collateral blood-flow circuits. The body compensates for the lack of blood flow to a degree by supplying blood to the affected area from other directions, Dr. Liebeskind says. This ability varies from person to person, depending upon location within the brain

## Stroke Symptoms

Individuals with hypertension, diabetes, and other known risk factors need to be especially alert to early recognition of stroke symptoms, and should seek immediate medical attention if those symptoms occur, advises Dr. Adams:

- ▶ **NUMBNESS** of the face, arm, or leg, especially on one side of the body
- ▶ **CONFUSION**
- ▶ **TROUBLE SPEAKING** or understanding speech
- ▶ **DIFFICULTY SEEING** in one or both eyes
- ▶ **TROUBLE WALKING**; dizziness; or loss of balance or coordination
- ▶ **SEVERE HEADACHE**

and other factors. “Blood delivered via collaterals may sustain patients long enough to benefit from treatments that may work miracles in an otherwise devastating disorder”—treatments such as mechanical thrombectomy.

But does using a device that effectively removes clots from arteries really make people better? “The neurological community has wisely asked this fundamental question,” says Dr. Liebeskind: “*If you can open a vessel, is that enough?* Restoring blood flow to injured areas of the brain may be a tricky business.”

Informed decisions still must be made under time pressure, and every patient is different. “The large emphasis of stroke research taking place is about knowing when to treat and when not to,” Dr. Liebeskind says.

“The location of the problem needs to be considered, along with the wishes of the family and patient as to how aggressive they want to be. Often a younger patient has a better chance of coming through the procedure very well,” Dr. Adams notes.

But one size never fits all. “Age can be a risk for some aggressive procedures,” says Dr. Liebeskind, but it “doesn’t preclude such therapy based upon that alone.” His patient, Gertrude Pepp, is a shining example. “I wouldn’t have survived without my procedure,” she says. “I’m just so happy about it all.” **NN**

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