

Tossing a lifeline to a dying brain

Revolutionary treatment saves man from stroke that could have badly disabled him - or worse

By JOHN FAUBER

Ron Juechter lay on the hospital table awake and unsedated, with a tiny corkscrew pushed up into his brain. As a biological Drano roiled in his clogged artery, the doctors treating his stroke raced against the clock.

Within minutes they would have to withdraw the device and cease dispensing the clot-dissolving drug for fear that it would cause a serious, even fatal, hemorrhage in his brain.

It was 7:59 on a Friday night at Froedtert Memorial Lutheran Hospital as doctors looked at one more X-ray of the clot that was lodged like a dam in a river in Juechter's middle cerebral artery.

Despite more than two hours of work with the device, which had been threaded up through an artery in his groin, a large section of Juechter's brain showed up as a blood-deprived gray mass.

But as Juechter fidgeted on the table, Sam Zaidat, an interventional neurologist, kept at it. He knew he had to be close.

Stroke is the leading cause of serious long-term disability and the third-leading cause of death in the United States. It has retained those infamous rankings for years despite remarkable medical advances that can stop many "brain attacks" in their tracks.

“It’s sad. Maybe it is a tragedy. I’m very frustrated. (on the fact that fewer than 5% of stroke patients get t-PA, the clot-busting drug that helped Ron Juechter) ”

- Harold Adams,
professor of neurology at the University of Iowa and
spokesman for the American Stroke Association

Since 1996, the clot-busting drug t-PA, which had been used for years to treat heart attacks, has been approved as an intravenous treatment for strokes. Studies show that patients who get the drug have

much better odds of recovering without major disability.

But because the drug can cause serious bleeding in the brain, in most cases it must be given within three hours of the onset of symptoms, far sooner than when most patients finally get to the hospital.

In addition, many hospitals are not equipped to administer the drug. Or they shy away from using it because of the risk and a lack of reimbursement from Medicare and private insurers.

As a result, fewer than 5% of stroke patients get t-PA.

"It's sad," said Harold Adams, a professor of neurology at the University of Iowa and spokesman for the American Stroke Association. "Maybe it is a tragedy. I'm very frustrated."

Ron Juechter is a divorced, 55-year-old man of diverse interests. He's an overweight Packers fan with high blood pressure. He has a dry sense of humor, watches lots of sci-fi movies and loves to read fantasy novels.

About 2 p.m. on Friday, Sept. 30, Juechter was watching an ESPN program about the 1998 Packers/San Francisco 49ers game at his West Allis home. Spunky, his ancient cat, was lying next to him.

Juechter's head started aching. His fingers got tingly, then numb. He lay down on the couch, but rolled onto the floor.

"I couldn't get up," he said.

It's unclear how long he was on the floor, maybe an hour, before his older brother and roommate, Dennis, came home.

Dennis turned him over. The left side of his face drooped.

Dennis told Ron he was calling 911.

Always the jokester, even when his speech is severely slurred, Ron quipped, "Why don't you try 411?"

When paramedics rolled him into the ER at Froedtert, a team that specializes in treating stroke began evaluating him, and a CT scan was done.

Wisconsin has only three certified primary stroke centers, which can provide

the highest level of acute stroke care: Froedtert, St. Vincent Hospital in Green Bay and Theda Clark Medical Center in Neenah.

Shortly after 6 p.m., Juechter was wheeled up to a neurological angiography suite on the fifth floor. The three-hour window for intravenous t-PA already had expired.

But Froedtert also is set up to deliver the drug directly to the brain with a catheter. That method can be done up to six hours out. Doctors use fluoroscopy, a type of moving X-ray, to guide the device.

Juechter's blockage was a half-inch-long mass consisting of platelets; fibrin, an insoluble protein; calcium; and probably some cholesterol. It most likely broke off someplace else, such as the carotid artery or the heart, and traveled to the middle cerebral artery behind his right ear.



Photo/Karen Sherlock
Juechter practices brushing his teeth during occupational therapy at the hospital Oct. 4. He is expected to make a nearly full recovery.

In August 2004, the Food and Drug Administration approved another stroke treatment, the MERCI Retriever. MERCI (Mechanical Embolus Removal for Cerebral Ischemia) is a catheter device with a coiled metal tip that can grasp a brain clot and remove it. It is being used within eight hours of the onset of symptoms.

In a small trial, it proved effective as the first mechanical device for removing

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clots, but it had its own risks. In 7% of cases, it tore or perforated an artery or caused a piece of the clot to break off and move into another artery.

Zaidat, also an associate professor of neurology at the Medical College of Wisconsin, used both the MERCI Retriever and t-PA to attack Juechter's clot. But things were taking longer than expected as the clock ticked past the six-hour limit for the drug.

"A good portion of his brain isn't functioning right now," said Michael Connor, one of the doctors watching the images of Juechter's brain. "The cells are dying. But this is definitely his best chance."

As the doctors watched the progress of the device on four monitors, Juechter was getting agitated as he lay on the table covered with blue sheets. Patients in Juechter's situation are usually not sedated, so doctors can ask them questions to see how they are doing.

Juechter reached for the catheter line in his femoral artery.

"Ron, Ron!" nurse Janet St. Marie yelled, telling him to stop. She grabbed his hand and tied it down with a strap.

"If he pulls that out of his groin, it's game over," St. Marie said.

During a stroke, brain cells die faster than grains of sand rushing through an hourglass.

An estimated 1.2 billion brain cells, including 58 million neurons, die for each hour that an average stroke goes untreated, according to an analysis by Jeffrey Saver, a neurologist at the University of California-Los Angeles. Along with the cells, 420 billion synapses perish.

“You probably don't have good news for me.”

- Dennis Juechter, to a stroke nurse at Froedtert, His brother, Ron, had suffered a stroke.

The human brain has about 100 billion neurons and 3 trillion synapses, the micro-spaces through which the electro-chemical communications of brain cells travel.

Ideally, stroke patients should go to hospitals that offer t-PA and, if possible, mechanical clot removal. (After years of prodding from stroke doctors, Medicare and Medicaid this month began paying hospitals an extra \$6,000 for use of t-PA in treating stroke patients.)

But many hospitals, including some large centers in urban areas, don't regularly provide those treatments, Saver said.

Instead, they provide aspirin and fluids, and that's about it.

"It's sort of Russian roulette when you call 911," he said.



Photo/Karen Sherlock
Juechter gets an exam from Sam Zaidat, an interventional neurologist, on Oct. 6. Six days earlier, Zaidat had removed a clot from Juechter's brain.

As if in a crowded bakery, numbers are handed out to people in the waiting area of Froedtert's emergency room. As the sitcom "What I Like About You" blared on an overhead TV, a couple dozen children and adults awaited word on the fate of their loved ones.

Two young girls passed the time eating Cheez-Its. Another little girl watched fish in the aquarium. Dennis Juechter sat by himself with a "19" plastered to his shirt. Eventually, he went to the cafeteria.

A stroke team nurse approached him there.

"You probably don't have good news for me," Dennis Juechter said.

At 8:06 p.m., Zaidat, the neurologist, was a few minutes past the six-hour limit when he looked again at the X-ray monitor and said the situation appeared to be slightly better.

After a few more minutes, the sweet sight of filled arteries reappeared in what had been a gray, bloodless area of Ron Juechter's brain.

"Markedly better, markedly better," proclaimed Connor, one of the physicians.

The nurse standing next to him applauded.

"How you doing, Ron?" Zaidat said loudly. "Can you move your left arm?"

At 8:20, Zaidat said the other branch of the artery was opened and blood flow was restored.

"What a tough clot," he said as he walked out of the room.

Removing the clot was just half the battle. As they wheeled Juechter down to the neurological intensive care unit, the big question was, how much damage did it do?

On Sunday, Oct. 2, 48 hours after the stroke hit, Juechter was sitting up in his room in intensive care, drinking ice water through a straw.

A nurse handed him a comb. He ran his right hand through his thinning hair several times, unaware that the comb was in his left hand.

By Thursday, Oct. 6, Juechter was out of the ICU. He said his head seemed much clearer.

Physical therapist Cheryl Vorwald got him up from his chair and walked him up and down the hospital hallway a couple of times.

"All right, Ron, we'll torture you a little more tomorrow," she said.

Zaidat also stopped by. He did a quick exam and told Juechter he was very pleased with his recovery.

Had the clot not been removed, Juechter most likely would have spent the rest of his life in a wheelchair, Zaidat said. He would have had slurred speech and problems swallowing, which would put him at higher risk of getting pneumonia.

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This past Wednesday, Juechter sat at the head of table in a small conference room at Froedtert with the team of about a dozen doctors, therapists and others who had been working with him over the previous 10 days.

He was told that he had made an exceptional recovery, but there was some mild impairment of his higher-level thinking skills that he should recover over the next year.

He was told that he should not drive or return to work for two months. He was discharged later that afternoon.

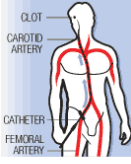
On Thursday, his first full day out of the hospital, Juechter sat in the same recliner where the stroke occurred nearly two weeks earlier. He wore a Packers sweat shirt as he watched a sports program. Spunky, his cat, roamed around.

Juechter said he plans to quit smoking, eat healthier and keep his weight down. He noted that while in the hospital he dropped from 225 pounds to 203.

"It's a hell of a way to lose 20 pounds," he said.

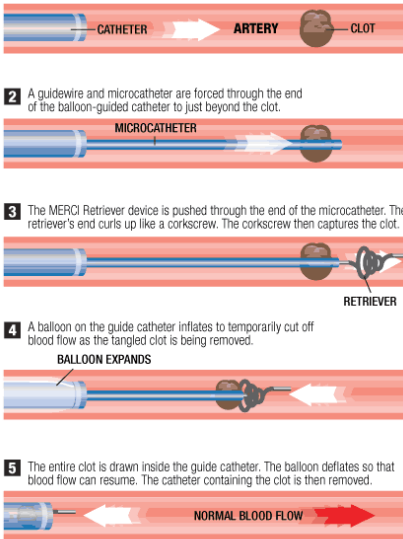
**STROKE TREATMENT
NEW CLOT-REMOVING DEVICE**

In August 2004, the Food and Drug Administration approved a new catheter-type instrument for removing clots in the brain. The MERCI Retriever (Mechanical Embolus Removal for Cerebral Ischemia) can be administered in conjunction with the clot-dissolving drug t-PA, which can break up certain types of blockages in the arteries of the brain. The MERCI Retriever has a coiled tip that can grab a clot and extract it. Here's how it works:



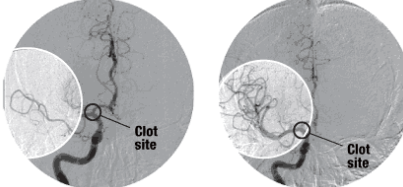
REOPENING BLOOD FLOW IN THE BRAIN

- 1 A clot in the brain is identified using angiography. With the help of X-ray imaging, a catheter is inserted into the femoral artery through an incision at the groin and directed to the carotid artery in the neck.
- 2 A guidewire and microcatheter are forced through the end of the balloon-guided catheter to just beyond the clot.
- 3 The MERCI Retriever device is pushed through the end of the microcatheter. The retriever's end curls up like a corkscrew. The corkscrew then captures the clot.
- 4 A balloon on the guide catheter inflates to temporarily cut off blood flow as the tangled clot is being removed.
- 5 The entire clot is drawn inside the guide catheter. The balloon deflates so that blood flow can resume. The catheter containing the clot is then removed.



BLOOD FLOW IN RON JUECHTER'S MIDDLE CEREBRAL ARTERY

AFTER STROKE: BLOOD DEPRIVATION **AFTER PROCEDURE: BLOOD FLOW RESTORED**



RECOGNIZING A STROKE

Every second is critical in detecting the warning signs of the medical emergency. Here are some symptoms common to the onset of stroke:

- A numbness and/or weakness in the arm or face. May affect only one side of the body.
- Confusion accompanied by difficulty understanding and speaking.
- Sudden difficulty seeing in one or both eyes.
- A loss of balance and motor skills, trouble walking, dizziness.
- A severe and sudden headache for no reason.

If you suspect symptoms of stroke dial 911 immediately.
For more information browse www.strokeassociation.org

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Sources: Concentric Medical, Froedtert Memorial Lutheran Hospital

Graphic/[David Arbanas](#)

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