

## Diagnosis by laptop extends medicine's reach

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### Wireless technology saves stroke victims

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When Imperial Valley welder Davin Brigman was suddenly paralyzed along his entire right side in August, he was actually very lucky.

The emergency team at Pioneers Memorial Hospital in Brawley, where he was driven by his wife, had just set up a video camera system that linked Brigman, 32, to a stroke expert 125 miles away at UCSD's Thornton Hospital in La Jolla.

There, from his wireless laptop computer, Dr. Brett Meyer had a near-perfect view of Brigman as well as all of his scans and tests. It was almost as if they were in the same room.

Zooming in through the camera's lens, Meyer noted Brigman's inability to move his right arm and leg or the muscles on the right side of his face — classic signs of stroke.

"The camera is so good, we can see the patient's pupils and watch his eye movements," Meyer said.

Within moments, Meyer sized up Brigman as one who would probably benefit from an injection of TPA, a drug proven to bust clots in arteries that take oxygen-carrying blood to the brain. Brigman's symptoms had come on less than three hours before, so there was just enough time for TPA to prevent long-term damage.

A few hours after the injection, Brigman's paralysis almost disappeared, Meyer said.

"This man was looking at a lifetime of being crippled," said Dr. Michael Berger, emergency room director at Pioneers. "Instead he was saved. And what we've accomplished is to get the very best experts in stroke to make decisions for these patients right here."

Brigman, who lives with his wife, Jessica, and their three children in Imperial, just north of El Centro, said he's regained 95 percent of his right-side function.

"I'm doing very good now, and I'm very grateful," he said.

Meyer and Dr. Patrick Lyden, director of the UCSD Stroke Center, launched the study, called STRokeDOC, to learn whether wireless high-speed Internet links can help specialists prevent damage in patients hundreds of miles away. They believe it can.

A report on their Internet diagnosis of 25 stroke patients will be presented today as 3,000 clinicians and scientists from around the world gather in San Diego for the American Stroke Association's annual meeting.

Often called a "brain attack," strokes affect 700,000 people a year in the United States and kill 163,000. An estimated 4.8 million survivors live with disabilities. Strokes have estimated annual costs of \$54 billion a year.

Until just a few years ago, little was known about how to treat strokes, although it is now clear that lowering blood pressure and making changes in diet, exercise and lifestyle are important in reducing the risk of having one.

But the use of TPA (tissue plasminogen activator) to clear clots in the brain is only appropriate for certain patients; many doctors are reluctant to use the drug for fear they may pick the wrong patient and inadvertently cause bleeding in the brain and more damage.

Doctors at Pioneers hospital are the first to admit they're not specially trained for the tricky task of dealing with a brain attack.

A physician must decide whether to use TPA within three hours of the patient's feeling the first symptoms. If a specialist is far away, or busy with other patients, the window in which to use TPA begins to close.

Many neurologists in San Diego County and elsewhere say the risk of making a mistake and generating a lawsuit just isn't worth the gamble.

They also say Medicare reimbursement doesn't cover the cost of evaluating and administering TPA, which can involve multiple specialists and take hours.

As a result, as few as 3 percent to 5 percent of stroke patients who could benefit from TPA actually get it.

That is starting to change, Lyden said, in part because of efforts like UCSD's telemedicine and STRokeDOC, which stands for Stroke Team Remote Evaluation Using a Digital Observation Camera.

At last count, STRokeDOC has allowed Meyer and Lyden to decide whether 39 patients in Brawley, El Centro, Escondido and as far north as Templeton, in San Luis Obispo County, were candidates for TPA and clot-busting drugs.

The wireless link has enabled the specialists to examine brain images, to scan test results and to observe symptoms even while stuck in traffic or visiting a friend, as long as the physicians have a laptop and wireless modem handy.

"We can evaluate stroke patients regardless of where we or they are located," Meyer said. "That saves time, and time saves brain."

With the ability to consult specialists far away, Meyer and Lyden say more doctors may be persuaded to use TPA.

Lyden said at UCSD and other centers with expertise in stroke care, the percentage of stroke patients who get TPA is as high as 25 percent, compared to the rate of 3 percent to 5 percent.

Another factor increasing pressure on hospitals and doctors to centralize stroke care comes from the Joint Commission on Accreditation of Healthcare Organizations, or JCAHO. Last December, the commission announced its decision to certify a new category of "Primary Stroke Centers" for hospitals willing to devote resources to stroke care.

Five centers have been designated nationally so far, including the UC Irvine Medical Center in Orange County and Good Samaritan Hospital in San Jose, said JCAHO official Maureen Potter. The criteria are strict.

Investigators from JCAHO want proof that teams of experts trained in stroke management are available to spring to action.

Stroke patients must be evaluated by an expert at bedside, via telemedicine or telephone within 15 minutes of entering a hospital; undergo a CT scan within 25 minutes and have a radiologist read the scan within 45 minutes to an hour.

That speed is necessary to determine if the patient would benefit from TPA, or other stroke medicines that become available in the future.

Certified hospitals also must promote education campaigns that emphasize the importance of recognizing stroke symptoms and getting to a hospital within three hours.