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### FROM OUR ARCHIVES

 

#### Vol. 12 • Issue 9 • Page 33 A Seamless System for Stroke Care

Georgia CIO describes how telemedicine system improves outcomes for stroke patients.

By Lisa Tucker

Telemedicine can deliver the same care to patients presenting for stroke care at a rural hospital as is received by patients presenting at a metro hospital. Unfortunately, rural hospitals are least able to afford costly telemedicine solutions. In order for a rural hospital to realize the benefits of a telemedicine/telestroke system, the solution must be low-cost, mobile and upgradable.

As a licensed 47-bed medical center, McDuffie Regional Medical Center (MRMC) in Thomson, Ga., offers medical and health services for the people of McDuffie County, Ga., and surrounding communities, including intensive and cardiac care, and 24-hour laboratory and radiology services. For a small rural hospital, we are always busy. Our emergency care department provides full-time evaluation, stabilization and treatment to more than 11,000 patients annually. Our surgeons specialize in surgery, orthopedics, podiatry and ophthalmology procedures. Unfortunately, one area where we lack adequate care is neurology. And, since we are located in rural Georgia, which is in the heart of America's stroke belt, we needed a telemedicine solution that would connect us with neurologists at other hospitals so we could improve the outcome for more stroke patients.

#### Stroke types

In laymen's terms, there are two types of strokes: ischemic strokes, which are caused by a blood clot in an artery; and hemorrhagic strokes, which occur when weakened blood vessels within the brain rupture and bleed into the surrounding tissue. In 1996, the Food and Drug Administration approved an effective treatment for acute ischemic strokes, tissue plasminogen activator (tPA). While tPA can be a miracle drug when administered to break up a clot, the drug will exacerbate the problem and can cause death if administered to a person presenting stroke symptoms caused by a bleed. But without a neurologist on staff, our hospital was not qualified to determine the type of stroke a patient was having, which is critical for initiating stroke treatment protocol.

To make matters worse, tPA must be delivered within three hours of the onset of a stroke in order to reverse the damage. This small window of time can disqualify patients in rural areas such as ours if they can't get to a larger hospital with a neurologist on staff in time to receive the treatment. Since we are at least 30 minutes from Augusta, Ga., and 90 minutes from Athens, Ga., and Atlanta, in the past, most of our stroke patients didn't make it to a larger hospital with an on-staff neurologist in time to receive lifesaving tPA.

In early 2002, a group of neurologists from the Medical College of Georgia (MCG) in Augusta approached our hospital with a proposed solution. MCG is an academic health center and health sciences research university. The neurologists had devised a cost-effective concept of providing a simple mobile cart outfitted with off-the-shelf technology, which would allow hospitals in rural communities to communicate with a neurologist located anywhere in the world. The cart consisted of a remote-controlled camera, PC, a cordless telephone and basic wireless networking equipment. Ideally, they were looking for rural facilities that had the wireless network infrastructure in place to allow the cart to be operated as a mobile unit within the ER.

#### REACH system

In 2001, when it was rare for rural facilities to have such technology, our facility had implemented a picture archiving and communications system (PACS). Our ability to quickly transmit digital CT images made us a perfect candidate for the MCG pilot program. Our facility always has been progressive with technology, and this telemedicine initiative, called Remote Evaluation of Acute isChemic stroke (REACH), was an ideal opportunity to directly correlate technology with improving patient outcomes. We were excited about the possibilities and future implications of this system, and we became the first hospital to treat a patient under the pilot.

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Since we were one of the first hospitals installed with the REACH system in the United States, we expected some implementation and integration challenges. However, the implementation process was smoother than anticipated. Within an hour, the REACH team had installed the cart in our ER. The REACH team also trained the doctors, nurses and emergency medical service technicians on how to use the system. The staff learned quickly, as the standard Windows-based software is intuitive for user input. The EMTs learned to initiate REACH protocol from the field, due to the limited three-hour treatment window for tPA. This protocol also allowed the ER and radiology staff to be prepared and waiting to conduct a CT scan as soon as the patient arrived at MRMC by ambulance.

As far as integration was concerned, the system worked seamlessly with our clinical and information systems. Because the system is Web-based, there were no special hardware or software requirements, and no interface issues or expenses. It was one of the least complicated implementations I've experienced since joining the hospital 20 years ago.

Since 2003, we have initiated more than 110 consultations and given tPA more than 20 times. Since then, the hospital and patients have realized tremendous benefits from the technology.

From strictly a technology perspective, the telestroke system offers mobility, is low-cost, and can be upgraded. All of these features are crucial to the success of a telestroke and telemedicine system. Let's look at each area:

*Mobility.* Because the telestroke technology is Web-based, the consulting physician can treat the patient from literally anywhere in the world with an Internet connection. We actually had a stroke patient present in our ER during a national neurology conference being held in California. All of our Georgia-based neurologists were out of town. We initiated the REACH protocol, and a neurologist was able to go up to his hotel room, log into the REACH Web site, review CT scans and test results, and control the camera in the ER here in Georgia in order to conduct his assessment. Because of the highly mobile telestroke system, our patient was treated successfully from the other side of the country.

*Cost.* Our telestroke system is subscription-based, as compared to having to purchase proprietary software. The cart components are off-the-shelf hardware, which also controls cost. The system utilizes the facility's existing wireless infrastructure and security for connectivity, along with standard wireless phones for communication, eliminating the need for additional networking equipment. The system works with existing digital images, as long as they are compatible with the DICOM 3.0 format, and are not dependent on any one PACS vendor.

*Upgradability.* The telestroke technology is Web-based, so each facility always has the latest version available without having to schedule updates to maintain the most current release. This provides consistency and standardization, without requiring the hospital's IT department to perform manual updates.

More important, from a care perspective, REACH has benefited our patients. Neurologists can now conduct a neurological assessment from literally anywhere in the world, with the ability to control the camera, zoom in to look into the patient's eyes, and recommend treatment for the patient. REACH allows our community to receive potentially life-saving stroke treatment that would not otherwise be available in a rural facility.

We regularly host site visits and tours of our facility for local civic groups, and the REACH system is often the highlight of the ER tour. We tell visitors about a patient who presented to our ER 90 minutes after the onset of stroke, with right-side paralysis and inability to speak. Utilizing the REACH system, the patient was evaluated, and administered tPA. Within 30 minutes of receiving the treatment, the patient was able to sit up and talk to the nurses, as well as move her right arm and leg with no deficits noted. She was able to converse freely and even feed herself. Without the REACH program, we would not have been able to administer the medication to break up the clot.

While not every patient has such dramatic and immediate results, this case illustrates the effectiveness and value of the REACH program. Without it, this patient would likely have faced a long recovery and rehabilitation process and may not have fully recovered to her pre-stroke abilities.

As this example demonstrates, the field of health IT today, while infinitely more complex, has become extremely rewarding. The technology we implement now has the ability to directly affect a patient's outcome and quality of life.

As an IT professional, it is satisfying to know that the many long hours spent in server rooms, wiring closets, vendor negotiations and interface testing really can make a difference in the life of a patient. The REACH telemedicine application is evidence of that vision, and a glimpse of what technology can potentially offer to health care in the future.

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