Telemedicine helps providers navigate increasingly complex stroke decisions — here’s how
INTRODUCTION

In the United States, someone has a stroke every 40 seconds, and every four minutes, someone dies of stroke. The condition is the fifth leading cause of death for Americans, accounting for 140,000 fatalities per year, according to the CDC. Strokes are particularly problematic for small, rural hospitals that often lack timely, convenient access to specialty clinicians or for larger hospitals that lack full specialty support.

In addition to the patient health concerns they present, strokes are costly. Stroke care costs the United States an estimated $34 billion each year, according to the CDC. As such an expensive problem for individuals and hospitals throughout the nation, healthcare providers and medical researchers seek the optimal method to treat stroke patients and improve specialty care access to rural facilities.

Small or understaffed hospitals see value in using telemedicine to accelerate stroke care by connecting patients with remote specialists from across the U.S. — a particularly important concern for time-sensitive treatments, such as stroke management.

THE STRUGGLE TO TREAT STROKE PATIENTS

Effective stroke treatment depends on a crucial factor: time.

“Time is brain,” says Mitchell Rubin, MD, senior neurologist at national telemedicine provider Specialists on Call. “A stroke happens when an area of the brain loses blood supply. ... To save that part of the brain, or any part that is salvageable, you need to reopen that blood vessel and re-establish blood flow.”
A stroke occurs when blood supply to the brain is interrupted or reduced, hindering the transfer of oxygen and nutrients to brain tissue. The condition is characterized by a patient’s difficulty speaking, trouble seeing or limb paralysis, among other symptoms, according to a fact sheet from Rochester, Minn.-based Mayo Clinic.

Lack of blood flow causes brain cells to begin dying within minutes of stroke onset, making the amount of time elapsed since symptoms appear a key determinant in treatment success. The longer a patient goes without adequate blood flow to his or her brain, the more damaging the consequences. A 2006 study published in the journal Stroke estimated the typical stroke patient loses 1.9 million neurons for each minute the condition goes untreated.

These considerations make quick decision-making a central component of stroke care.

“The sooner you re-establish blood flow, the more likely you are to have a positive patient outcome,” Dr. Rubin explains. “It’s a very time-dependent illness in terms of being able to save damaged tissue.”

Traditional stroke care comprises two main avenues for treatment, according to the most recent stroke management guidelines from the American Heart Association and the American Stroke Association, released June 2015. These are intravenous thrombolytics and endovascular thrombectomy.

Intravenous thrombolytics, a medication treatment aiming to dissolve a blood clot to improve blood flow to the brain, is the “mainstay” of early stroke treatment. Intravenous thrombolytics may be administered within 4.5 hours of stroke onset for eligible patients, although the guidelines emphasize “every effort should be made to shorten any delays in the initiation of treatment because earlier treatments are associated with increased benefits.”

Endovascular thrombectomy, by contrast, describes a procedure in which a neuro-interventional specialist removes a large blood clot in an attempt to preserve brain tissue. To remove the clot, a trained physician threads a catheter through an artery in the groin to the brain, until the catheter is appropriately positioned to

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trap the clot. Endovascular thrombectomy requires a high degree of specialist expertise, not only to conduct the procedure, but also to review advanced vascular imaging – such as CT angiography or CT perfusion – to determine where the clot is located and whether certain regions of the brain are salvageable.

Under the 2015 recommendations, the American Heart Association and the American Stroke Association suggest a physician only perform endovascular thrombectomy within six hours of symptom onset.

“There is a premium on speed. … One doesn’t want to be reckless and make bad decisions, but one also doesn’t want to dally over this,” says B. Tilman Jolly, MD, CMO of Specialists on Call and an emergency medicine physician by training. “The brain is very sensitive to loss of blood flow and lack of oxygen going to the tissues. Literally every minute counts.”

**IMPROVING PATIENT OUTCOMES WITH ENDOVASCULAR THROMBECTOMY**

Intravenous thrombolysis is considered the gold standard for stroke care, according to the [American Stroke Association](https://www.strokesa.org). However, there may be an alternative pathway to salvage patient brain tissue, according to a recent study published Nov. 11 in *The New England Journal of Medicine*. 
The study, “Diffusion Weighted Imaging or Computerized Tomography Perfusion Assessment With Clinical Mismatch in the Triage of Wake Up and Late Presenting Strokes Undergoing Neurointervention” – otherwise known as the “DAWN” trial – suggested select patients may be appropriate candidates for endovascular thrombectomy up to 24 hours after experiencing stroke symptoms, a stark increase from the established six-hour timeframe.

For the study, researchers enrolled 206 stroke patients with symptoms – occlusion of the intracranial internal carotid artery or proximal middle cerebral artery – that presented between six and 24 hours earlier. Ninety-nine patients were randomly assigned to receive standard intravenous thrombolytics care, while the other 107 were assigned to receive standard care alongside endovascular thrombectomy.

The interim analysis, set for 31 months after the trial’s launch, suggested a high probability of success, as researchers found patients who received endovascular thrombectomy displayed fewer symptoms of disability 90 days after the procedure. The rate of functional independence in the thrombectomy group was almost half – 49 percent – compared to only 13 percent in the group that received standard care.

The researchers determined these positive results were so strong that they stopped enrollment in the trial, concluding the study at the interim analysis.

In an editorial accompanying the study, Werner Hacke, MD, PhD, a professor of neurology at the University of Heidelberg in Germany, wrote the DAWN trial had “strikingly positive results,” offering a comparison of the DAWN trial against five recent studies into the efficacy of endovascular thrombectomy for the treatment of stroke, all of which had shown positive outcomes.

“These imaging-based approaches represent a new ‘DAWN’ for the selection of patients who are likely to benefit from thrombectomy that is performed far longer after the onset of stroke than current guidelines suggest, at least among patients who have severe stroke, vascular occlusion and penumbral tissue,” he wrote.

Although promising, the results do not suggest all patients should receive endovascular thrombectomy up to a full day after the onset of stroke symptoms. In the DAWN trial,
appropriate patients were selected based on a physician’s review of imaging studies, such as MRI or CTA/CTP. Patients were chosen if they had a region of the brain that, while perfused, did not yet display brain tissue death.

“In essence, the usual six-hour time window for stroke treatment was replaced with a ‘tissue window,’” Dr. Hacke wrote, while noting reducing the time from stroke onset to treatment still “remains essential and results in the best outcomes.”

HOW TELEMEDICINE ACCELERATES THE STROKE TREATMENT PROCESS

There are a host of factors neurologists must consider to triage patients for endovascular thrombectomy.

When a patient arrives in the emergency room, a triage nurse or ER physician reviews his or her symptoms. Once ER clinicians determine stroke as the cause of the patient’s symptoms, they may perform a CT scan to visualize the extent of tissue damage, including whether there is active bleeding within the brain.

At this point in the care process, emergency staff should call a specialized neurologist to review the CT images and provide guidance on next steps. However, not all hospitals have appropriate neurologists on staff, and – depending on the time of day – a staff neurologist may be off-site. This is a particularly pressing problem for a time-sensitive condition like stroke.

“It’s a time issue in places where there isn’t a neurologist constantly available for emergency consultation,” Dr. Rubin says. “There are many hospitals in the country that don’t have any neurologists willing to come to the emergency room, and the [emergency medicine] doctors generally want a neurologist to say, ‘Yes, this is a stroke, and you’re doing the right thing.’”

Telemedicine providers like Specialists on Call support timely stroke care by

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partnering with hospitals to offer on-demand access to physicians in a range of specialties. For stroke care, this capability ensures clinicians in the ER have access to trained neurologists in a much faster timeframe, according to Dr. Rubin.

Additionally, specialized practitioners can help preserve a greater proportion of stroke patients’ brain tissue by determining patient eligibility for endovascular thrombectomy. To determine eligibility, a trained physician reviews advanced vascular imaging to determine whether there are salvageable regions of the brain.

“There’s going to be an increasing amount of data involved in making a decision about proper therapy [after stroke onset],” Dr. Jolly explains. “There are certain types of CT scans that are going to include more data about brain viability, and it requires a certain level of expertise to determine what to do with that information.”

The remote neurologist works with local ER clinicians to review the patient’s medical history, ongoing symptoms and brain and vascular imaging to determine the best course of action for each patient.
“We’re moving away from time-based decision-making to [evaluating whether] there is tissue to save,” Dr. Rubin says.

Not all hospitals have the capabilities to offer patients complex procedures such as endovascular thrombectomy – meaning patients selected for the procedure must be transferred to another facility. Allowing remote neurologists to assist in the diagnostic process will help smaller hospitals increase their revenue and improve patient care by ensuring only patients in need of the procedure are transferred, rather than feeling pressured to transfer all stroke patients for neurology evaluation. Specialists on Call helps hospitals ensure the right patients get the right care at the right time, and at the right facility.

“If you’re in a little hospital somewhere that doesn’t have its own interventional team, you don’t want to transfer all your stroke patients to the big university. You only want to transfer those patients who may benefit from a tertiary hospital and keep everyone else in their local community setting,” Dr. Rubin says.

CONCLUSION

By accelerating and streamlining the diagnostic process for stroke patients, telemedicine providers like Specialists on Call are able to provide patients with better outcomes by increasing access to the most appropriate brain-saving procedures, grow hospital revenue by decreasing unnecessary transfers and give partner hospitals a competitive edge by strengthening their outcomes and clinical reputation for stroke care.

“Having us involved early in these cases benefits the patient, it benefits the local hospital and it benefits the tertiary hospital,” Dr. Rubin says.
Specialists On Call, Inc. (SOC) is the largest provider of acute care telemedicine services and technology to U.S. hospitals and partners with over 400 hospitals and systems across 36 states. Through its Neurology, Psychiatry, and Critical Care solutions, SOC virtually delivers physicians directly to the patient’s bedside. The company’s Consult Coordination Center (CCC) is the hub of its clinical and operational support teams, and dedicated to accelerating patient care through a fully redundant and state-of-the-art platform.

SOC provides industry leading reporting and analytics and lean six sigma support to optimize workflows towards achieving high clinical outcomes. SOC’s flexible, enterprise technology platform enables hospitals to rapidly deploy and seamlessly optimize or expand a telemedicine program by leveraging its proven and scalable infrastructure. The organization was the first private provider of acute clinical telemedicine services to earn The Joint Commission’s Gold Seal of Approval and has maintained that accreditation every year since inception. For more information, visit www.specialistsoncall.com.