

Section Editors

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Telestroke

Is it safe and effective?

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In the United States, stroke is the number one cause of disability and one of the leading causes of death. Strokes are treatable, but only if identified and treated quickly. Neurologists have a saying that “time is brain,” because the longer a patient with a stroke goes without treatment, the greater number of brain cells that die. This means that the patient is more likely to die or become permanently disabled.

For stroke that is caused by a blood clot in the artery, the most effective medication is called tissue plasminogen activator (tPA). This works by breaking down the clot. tPA reduces the likelihood that a patient will become disabled when it is given less than 3 hours after the stroke begins. There is some evidence to suggest that tPA is still helpful between 3 and 4.5 hours after a stroke, but the benefit is less clear.¹ If too much time passes after a stroke begins, tPA is not helpful. A possible complication of getting tPA is bleeding inside the brain, called intracranial hemorrhage.

One reason that patients may not get treated appropriately for stroke is lack of access to hospitals that have specialized stroke centers. In rural areas, this is a large problem. Telestroke is a system used since the 1990s where local hospitals can work with specialists at stroke centers to identify and treat stroke and determine who may need to be transferred. Studies have shown that telemedicine for stroke is a reliable way to assess a stroke and to decide if tPA should be given. However, no one has ever compared the effectiveness of treating patients through telestroke with treating stroke on location at a specialized center.

This was the idea behind the review article “Safety and efficacy of thrombolysis is telestroke: A systematic review and meta-analysis.”² In their article, Dr. Kepplinger et al.² analyzed studies comparing telestroke-guided tPA treatment to treatment at a stroke center to see if there was a difference in safety and effectiveness between the two.

HOW WAS THE STUDY DONE? The authors of this review conducted 2 types of analyses. In the first, they grouped data from previous studies that compared patients who were treated with tPA after evaluation through audio-visual communication as part of a telestroke network to patients who were treated with tPA at a stroke center. In other words, they compared people

who used telestroke against ones who were seen in person by the doctor. In their second analysis, the authors tried to determine if a thorough telestroke evaluation was superior to telephone-only consultation. In other words, was telestroke better than a telephone consultation?

In both of the analyses, the authors compared safety. They looked at 3 things to measure safety. First, they looked at one of the complications of tPA: bleeding in the brain (also called intracranial hemorrhage). Second, they looked at the most severe consequence of stroke: death. Third, they looked at how well a person did 3–6 months after they had a stroke, using a disability scale called the modified Rankin Scale. The modified Rankin Scale is a commonly used, standardized scale that measures the amount of disability a patient has after stroke.

Although many studies were available in the medical literature, the authors used very specific criteria to decide which articles were most helpful. In total, the authors analyzed 5 studies to compare telemedicine vs stroke center treatment with data from 1,791 patients. They analyzed 2 studies to compare telemedicine to telephone consultation with data from 72 patients.

WHAT DID THE STUDY SHOW? The authors first compared safety and effectiveness of telestroke evaluation leading to tPA treatment when compared to stroke center tPA treatment. When tPA was given less than 3 hours after a stroke, they found that there was no significant difference between the 2 groups. In other words, the symptomatic intracerebral hemorrhage rates, death rates, and functional independence after 3 months between the 2 groups of patients was the same.

They then compared the safety and effectiveness of tPA treatment after telestroke evaluation to tPA treatment after telephone only consultation. They found no statistically significant difference in intracerebral hemorrhage rates, death rates, or functional independence after 3 months. However, due to the small number of patients, and problems related to how these studies were conducted, the authors concluded that there was not enough information to be able to say that a phone consultation was as safe and effective as telestroke.

WHY IS THIS IMPORTANT? One of the reasons that so many individuals have disability or death from stroke is lack of timely diagnosis and treatment with tPA. Telestroke networks offer a solution that can extend care to a much wider population. For instance, telestroke could be used in rural areas. In addition, it could be used in countries where access to a stroke center is limited. In their systematic review, Kepplinger et al. showed that the current data suggest that treatment of stroke through telestroke networks is at least as good and as safe as getting treatment at a stroke center. For patients in rural areas, telestroke could be used as a tool to quickly and efficiently evaluate and treat stroke. Since time is of the essence, the quicker a treatment can be given, the better the outcome.

When looking at telephone consultation vs telestroke, the authors decided that no statements could be made comparing them because of lack of data.

There are some important limitations of this review. Of the available studies, only a few studies

were included in this analysis. Of the studies that were reviewed, even fewer included information about how the patients were doing a few months after their stroke. In addition, fundamental differences between patients treated in rural areas with telestroke and patients treated at stroke centers could have affected the results. Although more study is needed, Dr. Kepplinger's study suggests that telestroke can be an important tool for hospitals to use to quickly, safely, and effectively treat people with acute stroke.

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About stroke

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WHAT IS A STROKE? A stroke, sometimes called a brain attack, is caused by the sudden loss of blood flow to the brain or bleeding inside the head (see below for more details). When a stroke occurs, brain cells die. The damage to the brain can cause paralysis, speech problems, loss of feeling, and memory problems. In more severe instances, stroke can cause coma and possibly death. If a person is having a stroke, he or she needs to seek medical attention right away. Immediate medical attention can help reduce the chances of death and disability. In addition, there are many things a person can do to prevent stroke from happening.

WHAT ARE THE WARNING SIGNS OF STROKE? The “Give Me 5” uses easy-to-remember words to help identify the 5 signs of stroke:

- Walk—is their balance off?
- Talk—is their speech slurred or face droopy?
- Reach—is one side weak or numb?
- See—is their vision all or partly lost?
- Feel—is their headache severe?

HOW COMMON IS STROKE? Every year, about 780,000 people in the United States have a stroke, and about 160,000 die. Stroke is the nation’s number 5 killer after heart disease, cancer, lung disease, and accidents (CDC.gov). Stroke is the number one cause of adult disability.

Stroke is an emergency. Call 911 immediately if you or someone you know experiences any of the above warning signs. Write down the time the symptoms started. Sometimes these warning signs last for only a few minutes and then stop. But even if that happens or if you feel better, call 911 for help.

RISK FACTORS FOR STROKE THAT CAN BE TREATED OR CHANGED

- High blood pressure
- Atrial fibrillation (an irregular heartbeat)
- Diabetes
- Cigarette smoking
- Hyperlipidemia (high fat level in the blood)

- Alcohol abuse
- Obesity
- Sickle cell disease

WHAT CAUSES A STROKE? There are 2 types of stroke or brain attack. Ischemic stroke is caused by an interruption of blood flow to the brain. Hemorrhagic stroke is caused by bleeding inside the brain.

About 85% of all strokes are ischemic. Ischemic stroke can be caused by narrowing of the large arteries to the brain, also known as atherosclerosis. If a clot forms in the neck vessels, pieces can break off and block a brain blood vessel. Clots may also form in the heart and travel by blood flow to the brain vessels, where they become lodged.

Hemorrhagic stroke is caused by the bursting of a blood vessel in the brain. It accounts for about 15% of strokes. Subarachnoid hemorrhage occurs when there are weak spots on brain arteries (aneurysms) that burst, and cover the brain with blood. Blood vessels in the brain can also burst if they are weakened by high blood pressure, diabetes, and aging.

WHAT ARE THE TREATMENTS FOR STROKE? Immediate medical care is critical for the person who is having a stroke or brain attack. New treatments work only if given within a few hours after the onset of a stroke. For example, a clot-busting drug must be given within 3 hours of stroke onset.

HOW IS STROKE PREVENTED? Some risk factors—age, sex, race, and a history of stroke in the family—cannot be changed. However, many others can be controlled. Most controllable risk factors relate to the health of the heart and blood vessels. The following can help prevent stroke:

- Having regular medical checkups
- Controlling high blood pressure
- Not smoking; stopping if you do
- Treating heart disease, especially an irregular heartbeat called atrial fibrillation
- Improving diet: avoid excess fat, salt, and alcohol
- Exercising
- Controlling diabetes
- Seeking immediate medical attention for warning signs of stroke

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