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## HEALTH & WELLNESS

# For Treating Severe Strokes, All Hospitals Aren't Equal

A revolutionary procedure called thrombectomy can treat severe strokes, but most hospitals in the U.S. don't perform it

*By Thomas M. Burton*

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*Providence, R.I.*

**People who suffer** severe strokes here can avoid the worst if stricken within a 30-minute ambulance ride to Rhode Island Hospital, the region's only comprehensive stroke-treatment facility.

Just across the Taunton River in Massachusetts, patients even closer to Rhode Island Hospital aren't so lucky. There, state emergency-medicine rules decree that stroke victims are taken to local hospitals offering more routine treatment. Typically, those patients have to wait an hour or more before being transferred to RIH in Providence, doctors say.

Research suggests the chances of recovering from a severe stroke depend on quick access to a new treatment called a thrombectomy, offered in this region only by RIH. By removing a blood clot—before the stroke damages much brain tissue—the revolutionary procedure can mean the difference between full recovery or life in a nursing home. Or worse. Across the U.S., 175 hospitals certified as “comprehensive stroke centers” can do thrombectomies.

About 700,000 Americans have strokes caused by clots each year. Of those, up to 25% are estimated to be severe strokes involving a big clot in a major artery to the brain. Those severe-stroke patients are the ones who can benefit from thrombectomy. A catheter is slid into the brain through the artery system, grabs the clot and, if all goes well, pulls it out during the first pass. Blood flow is restored and the stroke ends.

“There is no more revolutionary improvement in medicine than the thrombectomy,” said Ryan McTaggart, director of interventional neuroradiology at Rhode Island Hospital, which is affiliated with Brown University. “But it is very time-dependent.”



George Tremblay, of Charlestown, R.I., had a thrombectomy shortly after suffering a stroke in May, and returned home from hospital the following day. PHOTO: SUE TREMBLAY

America’s ambulance protocols are a hodgepodge. Many regions and some states, like Massachusetts and Maryland, generally rush patients to one of the nation’s 1,112 “primary stroke centers” or equivalent hospitals. Despite the label, most of these institutions don’t do thrombectomies. For example, Holy Cross Hospital, the sole hospital in the busy Washington suburb of Silver Spring, Md., handles about 500 stroke cases a year. It is a primary stroke center. Patients who need thrombectomies are transferred to hospitals in Washington or Baltimore. Holy Cross says it follows Maryland state requirements that severe stroke patients be transferred within two hours.

But various studies show that severe stroke patients fare better if taken directly to a thrombectomy hospital instead of waiting for a transfer to one. In many severe stroke cases, a patient who waits more than an hour for a thrombectomy has lower chances of a full recovery. Since most hospitals don’t do thrombectomies, transfer sometimes is necessary. If so, faster is better.

Some patients lose critical brain tissue in just an hour or two. Others can benefit from a thrombectomy up to 24 hours after the stroke. “The one-hour delay leads to one patient out of five who is disabled and not able to care for themselves,” says Mahesh Jayaraman, director of Rhode Island Hospital’s neurovascular center.

George Tremblay was among the lucky ones. He lives in Charlestown, R.I., a 30-minute ambulance ride to Rhode Island Hospital. On May 19, the retired biochemistry professor was

trying to get on a tractor to help at his wife's plant sale, but slumped to the ground and couldn't speak. His wife called 911. Emergency-response personnel assessed his condition and bypassed two nearer hospitals in favor of RIH, where he had a thrombectomy.

Dr. Jayaraman did the emergency procedure in just 15 minutes. Professor Tremblay recovered fully. "I would have gone home immediately after the procedure if they'd let me," recalled Professor Tremblay, who is 80 years old. "But I was able to go home the next day."



Dr. Jayaraman, right, seen with Dr. McTaggart, performed a thrombectomy on Professor Tremblay at Rhode Island Hospital earlier this year. PHOTO: JESSE BURKE FOR THE WALL STREET JOURNAL

By contrast, the worst case played out for 87-year-old Edward Perry. He had a stroke at breakfast recently and was taken by ambulance to a hospital more than 30 minutes from Providence. Brain images showed little damage. Doctors spent 62 minutes treating Mr. Perry before transferring him to RIH for a thrombectomy. But a new image there showed it was too late for one: too much brain tissue had died. Paralyzed, and using a feeding tube, Mr. Perry was moved to a palliative-care center. He died soon after.

Limiting patient access to thrombectomies are local, state and regional rules that compel ambulance drivers to bring patients first to hospitals that don't do the procedure. Less-specialized hospitals have fought in state legislatures and local emergency-medicine boards to treat stroke patients, who represent revenue. Many say they are able to treat most of the stroke patients they admit successfully.

Most lower-tier hospitals designated as "primary stroke centers" are certified by a private accreditation group called the Joint Commission. These hospitals can give some stroke patients an anti-clotting drug, which works for less severe strokes, but generally not for the severe ones causing major disability. Few people realize that most "primary stroke centers" actually can't treat the worst strokes with thrombectomy and must transfer patients to hospitals that can.

(The Joint Commission estimates that about 30% can do them.) That means losing time before a thrombectomy, often leading to worse outcomes.

“The term ‘primary stroke center’ became meaningless because now almost every urban-area hospital is designated a primary stroke center,” says Stephan A. Mayer, chief of neurology at Henry Ford Health System in Detroit.

Rhode Island Hospital is the center of a hub-and-spoke system that includes 15 other hospitals. Patients within 30 minutes of RIH go directly there, under Rhode Island law. But Massachusetts EMS protocols require that hospitals in Fall River, Mass., about 20 miles from Providence, generally get stroke patients first, before any are transferred to RIH.

David Faunce, executive director of the Emergency Medical Services Council in the southeast Massachusetts region that includes Fall River, says this isn't his preference. His paramedics assess stroke patients with a scale where the most severe strokes are graded a 4 or 5.

“My professional opinion is that if you're a 4 or more,” Mr. Faunce says, “why wouldn't you want to go to a comprehensive stroke center” like Rhode Island Hospital? The EMS Council's medical director declined to comment.

Of course, specialized hospitals would be swamped if they treated every stroke patient. And thrombectomies often aren't necessary for minor strokes. That leaves ambulance services with a tough, but doable, task: distinguishing the most severe strokes from routine ones.

The Society of NeuroInterventional Surgery, which urges ambulance triage and direct transport for thrombectomy across much of the U.S., is lobbying states to change the rules.

Many studies suggest that taking severe cases to thrombectomy centers leads to dramatically better outcomes. In one 2017 study of 562 severe stroke patients, Jason W. Tarpley, director of the Pacific Neuroscience Institute in Santa Monica, Calif., and colleagues found patients transferred to a thrombectomy-capable hospital, after first visiting another hospital, were five times as likely to be disabled or die than those taken straight to a thrombectomy hospital. A study by Dr. McTaggart, Dr. Jayaraman and colleagues this year concludes that longer time spent at primary stroke centers “appears to have a deleterious effect on outcome.”

Dr. Jayaraman, Dr. McTaggart and many others who do thrombectomies say primary centers should be bypassed if there is a thrombectomy center 45 minutes farther away. Primary stroke centers, which stand to make less money under such a protocol, say the science doesn't support such a change—and that it's important to give patients the clot-dissolving drug sooner.

The American Heart Association/American Stroke Association issued national guidelines on this and other stroke issues at its annual meeting in January in Los Angeles.

It said the benefit of bypassing hospitals to get to a thrombectomy hospital was “uncertain.”

Hundreds of stroke neurologists crowded into a Los Angeles conference room the morning after the guidelines were public, many of them protesting the new standard. “All of us were up in arms, because there is data” supporting ambulance bypass, said Ameer Hassan, head of neuroscience at Valley Baptist Medical Center in Harlingen, Texas. The association then took the rare step of retracting it, and expects to issue new guidelines soon.

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