For years, neurosurgeons now on the Lourdes stroke team have challenged clinical standards by using thrombectomy with stroke patients who are well past the standard window for such treatment. A study released earlier this year has validated their approach.

Current stroke treatment guidelines suggest that if more than six hours have passed from onset of stroke symptoms, too much time has passed for a patient to be helped by attempting physical removal of the thrombus. But the January 2018 New England Journal of Medicine study in which the Lourdes staff participated found that intervening beyond that time period could significantly reduce disability.

“We’ve believed for some time—and now know—that patients who have had symptoms for up to 24 hours can be treated with mechanical intervention,” said Mandy J. Binning, MD, chief of neurosurgery and stroke director at Lourdes. “We’ve seen the results.”

Compelling Outcomes Put into Wider Practice

The recently published study should significantly revise emergency stroke treatment practices. Its proposed guidelines change decision protocols for reperfusion therapy for patients with large-artery occlusion and ischemic stroke. As a result, it compels emergency departments to change the way they treat stroke patients.

“This study emphatically shows that we should not give up on these patients because of arbitrary time guidelines,” said Lourdes neurosurgeon and study co-investigator Erol Veznedaroglu, MD, FACS, FAANS, FAHA, Chair of Global Neurosciences Institute.

“We did what we believed was best for our patients. And the results have proven our approach.”

– Dr. Veznedaroglu

The international, multi-center clinical study, known as the DAWN trial, examined patients who were last known to be well six to 24 hours before treatment. Those who had their clot removed were almost four times as likely to be functionally independent at 90 days post-stroke, compared to those treated with medical management only. The data was so striking that the independent Data Safety Monitoring Board overseeing the study recommended the trial end early and the results announced.

Selection Also Based on Imaging and Symptoms

Global Neurosciences Institute, which includes Drs. Veznedaroglu and Binning, was among the first to challenge the treatment window guidelines. Its 2015 report in the Journal of NeuroInterventional Surgery found clot removal beyond the six-hour benchmark to be safe and effective for patients unsure of the time of symptom onset because the individuals were asleep when the stroke began.

Not all ischemic stroke patients are candidates for clot retrieval during this extended time period. If tPA alone does not dissolve the clot and restore blood flow, selection for thrombectomy is based on tissue status and symptoms. Neurosurgeons should only intervene when images of the brain, obtained using specialized CT scan technology, show that salvageable brain exists beyond the clot within the ischemic penumbra. Patients with a clinical deficit that is disproportionately severe relative to the infarct volume are also more likely to benefit from late thrombectomy, though prior to the new study most such patients have not received this treatment.

“For years, our team provided clot retrieval for selected patients after six hours, and we were often criticized for going against the guidelines. But we did what we believed was best for our patients. And the results have proven our approach,” said Dr. Veznedaroglu.
To achieve a protective effect on brain tissue, neurosurgeons at Lourdes are making off-label use of intra-arterial verapamil in a novel trial treatment of patients who have undergone thrombectomy for ischemic stroke. The verapamil—infused close to the site of the removed blockage—has a dual effect: as with cardiovascular uses, it dilates arteries for better blood flow, but it also directly protects neurons from further damage.

“The calcium channel blocker agent has a neuroprotective effect on the compromised brain tissue, so the patient gets both benefits,” said Mandy Binning, MD, a Lourdes and Global Neurosciences Institute (GNI) neurosurgeon. The GNI specialists are hosting this early study at Lourdes and have now included eight patients.

The trial selects patients up to eight hours after onset of symptoms from acute ischemic stroke. Once the team has re-established blood flow to the brain interventionaly, it administers the verapamil directly through the thrombectomy catheter into whichever intracranial artery has been treated. The drug readily crosses the blood-brain barrier, bathing brain tissue in the immediate vicinity of the infarct with the drug at high concentrations. Once the Lourdes/GNI team has included its goal number of patients in this innovative step, it will formally evaluate the results.

“Anecdotally, the outcomes have been much better than we even expected,” said Dr. Binning. With the combined treatments of clot retrieval and verapamil infusion, some patients have fully recovered from what otherwise would have been lethal, or at least significantly debilitating, strokes and have even enjoyed next-day discharge.

Currently, the only approved medical therapy for acute ischemic stroke is tissue plasminogen activator (tPA), a thrombolytic agent that targets the thrombus within the blood vessel. But the search for additional drug therapies that could save ischemic neurons in the brain from irreversible injury has continued. The stroke treatment field seeks neuroprotective agents that can reduce early ischemic damage to brain tissue and can prevent reperfusion injury.

Lourdes Health System has partnered with Global Neurosciences Institute (GNI) in a comprehensive hub for neurosurgical sciences in South Jersey.