Stroke team travels to patients, resulting in faster treatment and better patient outcomes

August 5 2021

Credit: Unsplash/CC0 Public Domain

In a pilot program in New York City, instead of transferring stroke patients to a specialized stroke center, a mobile interventional stroke team (MIST) traveled to the patient to perform emergency stroke surgery resulting in significantly less disability for patients three months after the stroke, compared to patients who lost

valuable time in the transfer to a higher level stroke center, according to new research published today in *Stroke*.

In this study, stroke specialists at Mount Sinai Health System in New York City developed a model called MIST to bring a surgical procedure known as endovascular thrombectomy to the patient. The MIST team was staffed with a neuro-interventionalist, a fellow in training or a physician assistant, and a radiologic technologist. The team traveled to the location of the patient to perform the endovascular thrombectomy procedure.

Medications to dissolve blood clots in large vessels in or leading to the brain are effective in about 15 percent to 20 percent of cases. However, most of the patients with a large vessel blockage also require endovascular thrombectomy. Endovascular thrombectomy is a surgical procedure used to remove large blood clots in patients with acute ischemic stroke. Nearly 90% of strokes are ischemic strokes, which are caused by blood clots in an artery that blocks normal blood flow and oxygen leading to the brain. Since 2015, endovascular thrombectomy has been the standard of care for stroke therapy and is detailed in the latest 2018 AHA/ASA stroke early management guidelines. Currently, the biggest barrier for stroke patients is timely access to this potentially life-saving procedure.

"Less than 50% of Americans have direct access to endovascular thrombectomy, the others must be transferred to a thrombectomy-capable hospital for treatment, often losing over two hours of time to treatment," said study co-author Johanna T. Fifi, M.D., associate professor of neurosurgery, neurology and radiology in the department of neurosurgery at the Icahn School of Medicine at Mount Sinai in New York City. "Every minute is precious in treating stroke, and getting to a center that offers thrombectomy is very important. The MIST model would address this by providing faster access to this potentially life-

saving, disability-reducing procedure."

Researchers examined data from the New York City MIST trial, focused on 226 stroke patients who received endovascular thrombectomy from January 2017 to February 2020 at four hospitals within the Mount Sinai Health System (one is a certified comprehensive stroke center and three are thrombectomy-capable stroke centers). Of those, 106 patients were treated by the MIST team, and 120 were treated using the drip and ship model of care, which requires the patient transfer to a hospital with expertise in endovascular thrombectomy. Current standards are to treat patients with medications to dissolve the clot and then transfer the patient to a hospital with the expertise to perform endovascular thrombectomy. All patients in the analysis were functionally independent before having a stroke.

Researchers compared 90-day functional outcomes between patients treated by MIST and those transferred to a stroke center for endovascular thrombectomy. Using the modified Rankin Scale (mRS) and the National Institutes of Health Stroke Scale to assess outcomes, they analyzed results of patients who were seen within six hours of stroke-symptom onset (early therapeutic window) and after six hours of stroke symptoms (late window).

Key findings were:

- For patients treated within six hours of stroke onset, the early window, the rate for a good outcome (mRS less than or equal to 2—mobile and can perform daily tasks) three months after the event was significantly higher in patients from the MIST group (54%), compared to the patients in the transferred group (28%).

- Among patients treated during the early window, functional outcomes at discharge were significantly better among the MIST

patients than the transferred patients.
- For patients treated in the late window, however, outcomes were similar: 35% of patients in the MIST group had a good 90-day outcome, compared to 41% in the transferred group.

"Ischemic strokes often progress rapidly and can cause severe damage because brain tissue dies quickly without oxygen, resulting in serious long-term disabilities or death," Fifi said. "Assessing and treating stroke patients in the early window means that a greater number of fast-progressing strokes are identified and treated."

However, the study's findings are limited because it was not a randomized study. Data for the NYC MIST trial was collected prospectively, however, this analysis was done retrospectively. "The MIST approach to care continues as more institutions and cities have implemented the model," Fifi said.

"This study stresses the importance of 'time is brain,' especially for patients in the early time window. Although the study is limited by the observational, retrospective design and was performed at a single integrated center, the findings are provocative," said Louise McCullough, M.D., AHA/ASA chair of the International Stroke Conference and chair of the department of neurology at McGovern Medical School at The University of Texas Health Science Center at Houston; chief of neurology service at Memorial Hermann Hospital—Texas Medical Center, Houston, Texas. "The use of a MIST model highlights the potential benefit of early and urgent treatment for patients with large vessel stroke. Stroke systems of care need to take advantage of any opportunity to treat patients early, wherever they are."

A 2019 American Heart Association Policy Statement recommends that Emergency Medical Services (EMS) should consider using additional travel time of up to 15 minutes to transport patients suspected of having

a severe stroke directly to a hospital capable of administering clot-dissolving medications and/or performing endovascular thrombectomy.

The study was funded in part by a grant from Stryker Corporation.

More information: Mobile Interventional Stroke Teams Improve Outcomes in the Early Time Window for Large Vessel Occlusion Stroke, *Stroke* (2021). DOI: 10.1161/STROKEAHA.121.034222

Provided by American Heart Association