

Mobile stroke units improve response times, outcomes for patients

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Mobile Stroke Treatment Units - specialized emergency rooms on wheels - are saving critical minutes in the diagnosis and treatment of stroke patients, according to two new studies presented at the American Stroke Association's International Stroke Conference 2015.

"Due to how critical time is in the [treatment](#) of stroke, using Mobile Stroke Treatment Units (MSTU) to provide pre-hospital evaluation and treatment of stroke should revolutionize the care of these [patients](#)," said Muhammad Shazam Hussain, M.D., lead researcher (abstract 54) and head of the Cleveland Clinic Stroke Program.

MSTUs are specialized ambulances staffed with a nurse, paramedic, emergency personnel and CT technologist. The unit also contains lab testing equipment and a CT scanner, which is required to diagnose the type of stroke. A stroke physician at the main hospital evaluated each patient via telemedicine and a neuroradiologist remotely assessed CT images. Two-way video conferencing allowed communication with the patient, family and stroke experts.

The CT image is an important diagnostic test distinguishing a hemorrhagic (bleeding) stroke from [ischemic stroke](#) (blood clot blocking vessels and blood flow). The treatment for these types of strokes is different, and cannot be started until the CT scan is complete.

In this analysis, researchers report the evaluation and treatment in the first three weeks of implementation of the MSTU in Cleveland as compared to a control group of patients brought to the emergency department via traditional ambulance in the preceding three months. They measured the time from call dispatch from emergency medical service (time of alarm) to the time a CT was completed and clot-busting treatment with tPA was started.

Twenty-three patients were treated in the MSTU and 34 in the emergency room. There were no significant differences in age or gender between the groups. Researchers found:

- The median time for alarm to MSTU arrival at scene was 13 minutes.
- There was a significant reduction of median alarm to CT scan completion times (41 minutes in MSTU versus 62 minutes in emergency room patients).
- There was also a significant reduction in time to treatment (median alarm-to-thrombolysis times - 64 minutes in MSTU vs 104 min. in emergency room patients).
- Six patients received clot-busting medication in the MSTU group and five in the emergency room group.
- There were no early complications of clot-busting in the MSTU group.

"Estimates are that [stroke victims](#) lose two million neurons (brain cells) per minute, so this reduction in time with the MSTU could potentially result in much better outcomes," Hussain said.

In addition, researchers noted the rate of clot-buster treatment was much higher in the MSTU than in the hospitals (26 percent vs. 14 percent). This also was much higher than the national average of 3 percent to 8 percent.

"The main reason for patients not getting treated is that they do not arrive in time for this treatment - 4.5 hours from symptom onset," Hussain said.

Hussain noted that another advantage of the mobile unit is being able to triage patients to the most appropriate hospital for their condition. An ischemic stroke patient with a large clot sitting in a major brain artery usually requires catheter-based treatment - available in larger facilities - in addition to an IV clot buster.

"We eliminate the need to transfer them from a small hospital to a larger hospital by getting them there directly, saving critical time and making the difference between patients being able to receive advanced, lifesaving treatments," Hussain said.

Provided by American Heart Association

In another study (abstract 52), researchers at The University of Texas Health Science Center at Houston (UTHealth) reported how they created the first mobile stroke unit to operate in the United States.

An ambulance company donated an ambulance and the Mobile Stroke Unit (MSU) build-out began with the purchase of a computed tomography (CT) scanner. A consortium was formed to set procedures and policies and obtain city and state licensing, inspections and develop an accountability system. Staffed by a neurologist and a registered nurse with stroke expertise, CT tech, paramedic and telemedicine connectivity, the MSU responds to acute stroke dispatches within a five-mile radius from 8 a.m. to 6 p.m. daily.

"Intravenous tPA remains the only level 1A treatment for ischemic stroke. Pooled analyses confirm the relationship of treatment success with time from symptom onset to initiation of treatment. However, despite two decades of efforts to streamline systems of care, most patients are treated beyond the two hours when tPA is most effective," said Stephanie A. Parker, R.N., B.S.N., lead author and project manager of the UTHealth Mobile Stroke Unit at the UTHealth Medical School in Houston, Texas.

The UTHealth MSU treated its first patient on May 16, 2014, and is carrying out acute stroke treatment within 10-18 minutes of arrival on location. During a 9-week run-in phase, approximately 2 patients were treated with rtPA per week on the MSU, and 40 percent of them were treated within the first hour from symptom onset, Parker said.

"Our ultimate goal is to show that patients treated on the mobile [stroke](#) unit will have better outcomes because of earlier treatment and, therefore, will have fewer long-term acute care needs and/or rehabilitation needs," Parker said.

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