Study: Get thee to a stroke center

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Hospitals with designated stroke centers are associated with up to 20 percent higher survival rate for patients with ischemic stroke and significantly greater use of acute stroke therapy. That is the conclusion of a study appearing today in the *Journal of the American Medical Association* which compares treatment and outcomes in stroke care between hospitals in New York State.

"The basic premise of stroke centers and stroke care – that coordinated care delivered around a specific disease can likely improve outcomes – is widely accepted," said University of Rochester Medical Center (URMC) neurologist Robert Holloway, M.D., M.P.H., a co-author of the study. "However, there has been limited empirical evidence demonstrating that admission to a stroke center is associated with lower mortality. This study shows that designated stroke centers not only have a greater adherence to evidence based practices but they also save lives."

The concept for comprehensive and coordinated stroke care was formalized in the recommendations of the Brain Attack Coalition in 2000. The goal was to emulate an approach to care similar to trauma centers by getting stoke patients to facilities where the specialists and infrastructure are in place to evaluate and treat them quickly.

In 2003, the Joint Commission began to certify stroke centers based on a set of 11 criteria which include coordinated neurological, surgical, imaging, laboratory, and emergency personnel and services, established protocols, 24-hour coverage, and a commitment to track and improve outcomes. Approximately 700 of the nation's 5,000 acute care hospitals

are currently designated as stroke centers.

Some states, including New York, have subsequently established their own designation programs for stroke care. The New York State Stroke Center Designation program is a collaboration between the state's Department of Health and the American Heart Association. By the end of the study, 104 of the state 244 hospitals were designated as stroke centers.

"The idea of designated stroke centers was born after research concluded that many lives could be saved if our medical system had the necessary personnel, equipment and organization to treat stroke patients rapidly and efficiently," said Ying Xian, M.D., Ph.D., a previous graduate student in Health Services Research and Policy with URMC Department of Community and Preventive Medicine and now a fellow with the Duke Clinical Research Institute and lead author of the study. "Our study was designed to evaluate whether or not access to quality and coordinated stroke care had an impact on processes of stroke care and patient outcomes."

The authors used data from the New York Statewide Planning and Research Cooperative System, a comprehensive set of patient data for every hospital admission in the state, and the Social Security Administration Death Master File. The study examined 2 years of data from 2005 to 2006 during which 30,947 patients were admitted to hospitals in New York State for acute ischemic stroke – the most common type of stroke that occurs when the blood supply to the brain is blocked. Roughly half of those patients were treated at state-designated stroke centers.

The authors compared treatment and outcomes between the hospitals with stroke centers and those without. Specifically, they looked at whether patients were administered thombolytic therapy – in the form of

TPA, a clot-busting drug that must be administered within 3 hours of the onset of symptoms – and mortality rates at 30 days and one year after admission.

The study's authors employed sophisticated statistical models including an analytical tool commonly employed by economists called instrumental variable analysis. This technique allowed the study investigators to control for such factors as age, health insurance, and other illnesses, an approach that – with a suitable "instrument" – effectively allows them to randomize the patient population.

"One of the limitations in studying a condition like a stroke is that you can't randomly assign people to hospitals with and without stroke centers for ethical and practical reasons," said Bruce Friedman, Ph.D., M.P.H., an associate professor in URMC Department of Community and Preventive Medicine and co-author of the study. "Employing instrumental variable analysis allowed us to come up with robust findings by statistically but not actually randomizing the study population."

The study found that individuals who were admitted to stroke-designated hospitals were 15 to 20 percent more likely to survive than those admitted to a hospital without the stroke designation, a survival rate that was sustained for up to a year after admission. Stroke center patients were also 3 times more likely to be administered TPA. These results could potentially translate to hundreds of lives that could be saved every year in New York State alone if every patient was treated at a stroke center.

To ensure that the disparities in outcomes were not a factor of disparities in the quality of acute care between the different set of hospitals, the authors also compared the mortality rates for gastrointestinal bleeding and heart attack (acute myocardial infarction). They found that the outcomes for these conditions were essentially identical in hospitals with

and without stroke center designation.

"This study demonstrates that if you have infrastructures in place to care for patients and families in a coordinated and cooperative fashion, you can achieve better outcomes through better processes of care." said Holloway. "As health care reform unfolds, every disease area large and small in terms of prevalence should be thinking of ways to develop similar infrastructure and processes to manage patients over time."

More information: *JAMA*. 2011;305[4]:373-380.

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