Are Acute Stroke-Ready Hospitals Ready?
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In 2005, an American Stroke Association Task Force report described the rationale and components of an integrated stroke system of care extending from primordial prevention through primary prevention, acute management, secondary prevention, and poststroke rehabilitation and recovery. The principle that optimal patient outcomes depend on the consistent implementation of care processes that are based on the best available evidence and that are facilitated by key organizational features was implicit in the approach. For acute stroke care, a 3-tiered system was envisioned composed of acute stroke–capable hospitals, having limited resources but possessing the means to deliver emergent stroke therapies; primary stroke center (PSC) hospitals, having the additional capacity to care for patients with stroke after the acute period; and comprehensive stroke center hospitals, having specialized resources and personnel to provide stroke treatment and rehabilitation that surpass those expected at PSCs. This tiered system of organization of hospitals was again endorsed in an updated American Heart Association/American Stroke Association policy statement.

At the time of the original American Stroke Association 2005 Task Force report, in cooperation with the American Heart Association, the Joint Commission had already begun certifying PSC hospitals based on criteria developed by the Brain Attack Coalition (BAC). Started in December 2003, the PSC program has been embraced throughout the country, with >925 hospitals having been certified in 48 states as of July 2012 (http://www.jointcommission.org). The competitive healthcare marketplace in the United States has likely contributed to a hospital seeking PSC designation because there was little move to improve hospital-based stroke-related care organization in the years before the PSC program began. Several states have now developed their own stroke center certification programs as well. Joint Commission PSC certification involves rigorous biannual on-site reviews and regular reports on a series of quality process measures. The American Heart Association’s Get With the Guidelines program and the US Centers for Disease Control and Prevention’s National Stroke Registry support and extend stroke center certification, with participation leading to incremental gains in compliance with many of the required PSC measures. More recently, the Joint Commission/American Heart Association/American Stroke Association began to certify comprehensive stroke center hospitals, also based on BAC recommendations. The BAC has now developed criteria for the last hospital-based component of the 3-tier stroke care system, the limited resource acute stroke–ready hospital (ASRH).

As the PSC certification program was implemented, a key issue was to determine whether the resulting changes in hospitals’ organization and processes of stroke care (a goal of ASRH certification) led to improvements in patient outcomes. The available data are primarily cross-sectional. An observational study using data from the New York Statewide Planning and Research Cooperative System found that admission to a designated stroke center versus a nonstroke center hospital was associated with lower 30-day all-cause mortality (10.1% versus 12.5%; P < 0.001) and more frequent use of thrombolytic therapy (4.8% versus 1.7%; P < 0.001). Using national Medicare data (beneficiaries aged ≥65 years), other analyses showed that care at PSC hospitals was generally associated with lower risk-standardized 30-day mortality rates for both ischemic and hemorrhagic (intracerebral and subarachnoid hemorrhage) stroke. There was, however, no difference in 30-day risk-adjusted readmission rates for either group of conditions, and the difference in mortality rates after ischemic stroke was small (10.7%±1.7% versus 11.0%±1.7%). In addition, some PSC hospitals had high risk-standardized mortality and readmission rates compared with some non-PSC hospitals. Therefore, care at a PSC hospital does not necessarily guarantee lower stroke-related mortality and does not seem to translate into lower early readmission rates. Data on differences in functional outcomes remain sparse.

Another analysis using national Medicare data from 2002 found that hospitals that obtained PSC certification in the first years of the program had lower in-hospital mortality (odds ratio [OR], 0.93; 95% confidence interval [CI], 0.90–0.96), 30-day mortality (OR, 0.92; 95% CI, 0.87–0.96), and 30-day risk-adjusted readmission rates (hazard ratio, 0.97; 95% CI, 0.95–0.99) before the certification program began and up to several years before PSC certification was obtained. Although focused primarily on ischemic stroke, as noted above, PSC hospitals also have lower mortality rates for hemorrhagic stroke. These observations suggest that organizational commitment to providing high-quality stroke care may be one of the drivers of the mortality differences between PSC and non-PSC hospitals. If so, it is important to identify the key components of PSC-level care that underlie the differences to minimize the burden on ASRHs, which by definition are already constrained by limited resources.

Given the limited available outcome data, distinguishing critical from non-critical PSC components has not been trivial. One study analyzing data from the University Health System Consortium found that none of the 11 BAC PSC stroke center
Standard continuing medical education alone, however, were treated with intravenous tissue-type plasminogen activator for the treatment of patients with ischemic stroke. At least 1 other study also found that a multilevel educational intervention aimed at hospital-based and community physicians in addition to the general public increased the number of patients with ischemic stroke in a community who were treated with intravenous tissue-type plasminogen activator. Standard continuing medical education alone, however, tends to have little effect on physician behavior, and whether such programs directed specifically at a hospital’s providers is effective in increasing the appropriate use of intravenous tissue-type plasminogen activator is uncertain. Although 8 hours of required continuing medical education for key members of the PSC care team seem reasonable, the requirement is empiric and has not been linked to improved patient outcomes. The BAC suggests that physician and nurse members of the acute stroke team of ASRH receive 4 hours of stroke-related education each year. Whether this is sufficient, even briefer focused education would suffice, or additional annual training is necessary needs to be systematically evaluated as meeting this admittedly less stringent standard involves both effort and cost.

The BAC anticipates that the majority of patients with stroke receiving initial care at an ASRH will require emergent transfer to a PSC or comprehensive stroke center. Although this is quite sensible for patients requiring advanced care and clinical expertise not available locally, it is not clear that this is necessary for most patients. The need to have a stroke unit is one of the organizational features that distinguish a PSC or comprehensive stroke center from an ASRH and that might be beyond the means of these facilities. A systematic review of data from 28 trials involving 5855 subjects found that care in designated stroke units is associated lower odds of death (OR, 0.81; 95% CI, 0.69–0.94), death or institutionalized care (OR, 0.78; 95% CI, 0.68–0.89), and death or dependency (OR, 0.79; 95% CI, 0.68–0.90) compared with care on general hospital wards.

Outcomes in a dedicated stroke unit were also better than with a mobile stroke team, but the essential features of stroke unit care leading to these improved outcomes remain uncertain. For example, 1 study found that comprehensive stroke units (combining acute and longer-term rehabilitative care) were associated with lower rates of death and dependency and better functional outcomes compared with other stroke unit models. This type of stroke unit is rarely found in the United States. In addition, the data on the benefits of stroke units do not consider whether the hospital participated in one of the national quality improvement registries. Transfer involves the use of resources and potential inconvenience for patients and their families. Demonstrated compliance with standardized process measures through participation in a national registry might obviate the hoped for benefit of transfer for many patients receiving emergent care at an ASRH.

Despite the challenge of identifying essential PSC elements causally related to improving patient outcomes, independent certification of the capabilities of hospitals to be designated as acute stroke ready is necessary. For example, in January 2011, North Carolina required each emergency medical service (EMS) agency in the state to have a triage and destination plan for patients suspected of having an acute stroke. As part of this requirement, each EMS provider had to identify the facilities in its service area as a Joint Commission–certified PSC hospital, an acute stroke–capable hospital (defined as having brain computerized tomographic scan availability 24/7 with an in-house technician, the ability to rapidly evaluate patients with an acute stroke, the willingness and means to administer intravenous tissue-type plasminogen activator to appropriate patients, agreement to accept all patients regardless of bed availability, and the provision of performance feedback and case review to EMS), or a community hospital, lacking these capabilities. Apart from PSC hospitals, the categorization was based largely on data reported to EMS agencies by each hospital. Of the 108 hospitals in North Carolina, 35% were classified as being or not being acute stroke capable differently by different EMS providers.

For hospitals in proximity to each other, it is appropriate for the public and EMS providers to understand their capabilities to provide stroke-related care. That assessment needs to be grounded on objective, independent reviews based on defined metrics linked to patient outcomes. Despite being in place for several years, however, issues remain even for PSC hospitals. The criteria for ASRHs reflected in the recommendations of BAC are an important step in the process of defining the final component of the 3-tiered acute stroke care system. Smaller hospitals, however, are presently under tremendous stress, and any added requirement needs to be as least burdensome as possible. As certification of ASRHs is programmatically implemented, it is important to recognize that the data linking specific components of the recommendations of the BAC to patient outcomes are limited. For those that are, the level of compliance should be the same regardless of setting. Initially, the most parsimonious set of criteria among those suggested by the BAC to establish an ASRH as truly ready should be selected so that the integrated stroke system can bring optimal care to the largest number of patients.

Disclosures

None.

References


**Key Words:** outcome assessment (health care) stroke centers
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Stroke. 2013;44:3289-3291; originally published online November 12, 2013;
doi: 10.1161/STROKEAHA.113.003474

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