Time Is Brain

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See related article, pages 2935–2939.

Since its initial approval in 1996, intravenous tissue plasminogen activator (IV tPA) within 3 hours of onset remains the only FDA-approved treatment for acute ischemic stroke. Although a metaanalysis suggests statistical benefit from IV tPA up to 4.5 hours after ischemic stroke onset, the major benefit occurs within 90 minutes of stroke onset. It is regrettable, therefore, that it often seems IV tPA is administered at 2 hours and 59 minutes if it is administered at all.

In this issue of Stroke, the 6 affiliated hospitals of the University of California, San Diego (UCSD), stroke system describe their “expedited code stroke protocol” under which almost 50% of patients who receive IV tPA are treated within 2 hours of stroke onset compared with the more typical 20% or less.

The UCSD team suggests that IV tPA delays are often related to “clinical habits” rather than the need to meet required exclusion and inclusion criteria. Three key “habits” were eliminated: First, routine blood tests except for glucose. Interestingly, blood glucose is not a required test before giving IV tPA but hypoglycemia can mimic acute stroke and is readily reversible. The risk of eliminating a routine international normalized ratio and platelet count appears to be low, but the actual time saved by avoiding these tests in most patients in the era of point-of-service testing is unclear. Second, reading the brain CT scan by a radiologist. Several studies have shown that obtaining and reading CT scans are the major sources of IV tPA delay in many hospitals. The National Institute of Neurological Disorders and Stroke (NINDS) stroke-time targets specify that the brain CT should be read within 45 minutes of emergency department (ED) arrival, but they do not specify who should read the CT. At UCSD the on-call stroke physician (presumably a neurologist) reads the CT rather than waiting for a radiologist’s interpretation. Although a neuroradiologist may be optimal, an appropriately trained neurologist or general radiologist is able to read a routine brain CT scan for hemorrhage and early signs of infarction with a similar degree of accuracy. Of note, the complexity of early stroke imaging and interpretation is evolving. A new trend in many hospitals is the routine performance of CT perfusion (CTP) and CT angiography (CTA) in the ED setting. The information gained by CTP/CTA is counterbalanced by the additional 15 to 30 minutes added to the time to treatment. As well, the value of perfusion imaging in selecting patients under 3 hours from stroke onset for IV tPA is unclear. CTA and CTP (or MRI) may help, however, in the “time to decision” for patients near or beyond 3 hours and for triaging patients for IV thrombolysis alone, IV + intra-arterial, or in rare instances direct transport to the catheterization suite. Third, telephone triaging. The NINDS stroke-time targets recommend “access to neurological expertise” within 15 minutes. Lack of quick access to a neurologist is often listed as the major impediment to giving IV tPA by emergency physicians. Access to a neurologist will probably remain an integral component of the stroke thrombolysis algorithm but is often initially accomplished over the telephone because a neurologist is not on site. However, the “neurological expertise” of emergency physicians may be sufficient at many JCAHO certified Primary Stroke Centers to initiate the IV tPA process and save valuable time. The goal is to have a multidisciplinary acute stroke team which actually begins with emergency medical services triaging enroute to the ED.

The need for urgent intervention in ischemia is not unique to acute stroke. Recently the American College of Cardiology has launched the D2B (door to balloon) quality initiative to increase the number of STEMI patients arriving in the catheterization laboratory <90 minutes from onset. Many of these lessons can also be applied to acute ischemic stroke thrombolysis. Key recommendations include: (1) more collaboration between ED physicians and interventionalists, eg, ED physicians activate the cath laboratory; (2) setting an explicit goal of reducing door-to-treatment times; (3) active senior administrative support; (4) flexibility in refining standardized protocols (eg, the UCSD protocol); (5) identifying champions for quality improvement; (6) development of collaborative multidisciplinary teams with shared goals; (7) “blameless” data feedback for barrier identification and resolution; (8) organizational commitment to change through action.

Current quality improvement targets for JCAHO Primary Stroke Centers include the number of patients treated within 2 hours of stroke onset with an ED door-to-treatment time of 1 hour. The UCSD team has set an ambitious benchmark and provided some tools to achieve these goals. The UCSD experience demonstrates that an integrated systems approach to acute stroke saves time, and, as we say, “time is brain.”

Disclosures

None.

References


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