Acute Stroke: It's All About Process and Team Improving Patient Outcomes in the Emergency Department

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ABSTRACT: **Earlier focused care from prehospital has demonstrated that stroke teams from prehospital to rehabilitation improve the care of stroke patients. Time is brain is the impetus for identifying patients quickly with stroke symptoms and initiating neuroprotective treatments. This article will discuss how effective team process: the merging of multidisciplinary care teams is the foundation of safe stroke care for patients in both the community and the hospital. (J Radiol Nurs 2016;35:198-204.)**

KEYWORDS: **Stroke; Intervention; Prehospital; Emergency department; Radiology; Team.**

Stroke care is time sensitive and requires a team response to promote optimal patient outcomes. Stroke teams are interdisciplinary and care for the patient at different points of the care continuum. These specialized stroke teams improve stroke outcomes by providing earlier more focused care, reduce delay to treatment, decrease hospital length of stay, and decrease costs (Schouten et al., 2008). Building emergency department process based on best practice from prehospital to disposition requires effective communication and collaboration among interdisciplinary team members.

STROKE RECOGNITION AND PUBLIC AWARENESS

Stroke is the fifth leading cause of death in the United States and a major cause of disability (Mozaffarian et al., 2016, p. e170).

- In 2013
  - On average, every 4 min, someone died of a stroke.
  - Stroke accounted for ≈1 of every 20 deaths in the United States.
  - When considered separately from other cardiovascular disease, stroke ranks Number 5 among all causes of death, behind diseases of the heart, cancer, chronic lower respiratory disease, and unintentional injuries/accidents (Mozaffarian et al., 2016, p. e170).

The public's knowledge of stroke signs and symptoms remains poor. When stroke symptoms are not recognized by victims, their family, friends, or bystanders, the patient may delay presenting for care. These delays in presentation place the patient at risk for being "outside the window" of intervention for stroke. Despite the public education to call 911 in 2011, only 53% of stroke patients arrived by emergency medical services (EMSs; Jauch et al., 2013). In the United States, treatment rates remain low with only 3.4%-5.2% of patients with acute ischemic stroke receiving tissue plasminogen activator (t-PA) the only drug treatment for ischemic stroke approved by the Food and Drug Administration (Cheng & Kim, 2015). Contributing factors to this low treatment rate include delays in recognition and activation of EMS, narrow treatment windows, and medical infrastructure (Cheng & Kim, 2015; Jauch et al., 2013).

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Table 1. Stroke chain of survival

Detection	Patient or bystander recognition of stroke signs and symptoms
Dispatch	Immediate activation of 9-1-1 and priority EMS dispatch
Delivery	Prompt triage and transport to most appropriate stroke hospital and prehospital notification
Door	Immediate triage to high-acuity area
Data	Prompt emergency department evaluation, stroke team activation, laboratory studies, and brain imaging
Decision	Diagnosis and determination of most appropriate therapy: discussion with patient and family
Drug	Administration of appropriate drugs or other interventions
Disposition	Timely admission to stroke unit, intensive care, or transfer

Adapted from Jauch et al., 2013, p. 4.

Detection is the first and critical link in the American Heart Association's (AHA) Stroke Chain of Survival (Table 1).

In May of 2009, the AHA and the American Stroke Association (ASA) recommended expansion of the t-PA window to 4.5 hr based on evidence from the European Cooperative Stroke Study (ECASS 3); this represented an important advance in the treatment of ischemic stroke care. As providers of stroke care, we may have a longer treatment window, but we must always remember that the sooner the treatment the more the opportunity for improved patient outcomes (del Zoppo et al., 2009; Jauch et al., 2013).

EMERGENCY MEDICAL SERVICE OR WALK-IN: THE CLOCK STARTS

The clock starts at Emergency Department arrival for the time targets recommended by research done for over 20 years. The 3-hr window for treatment of ischemic stroke with t-PA was established in 1996 by the National Institute of Neurological Disorders and Stroke Trial. In 2009, the treatment window for t-PA was expanded to 4.5 hr after time of symptom onset based on the research from the ECASS 3. The time of symptom onset or last known well time is the critical piece of information that treatment options are based on. The treatment window for t-PA has been expanded, but the treatment team must consider that some patient's treatment window may be expanded to 6 hr for endovascular intervention (Powers et al., 2015).

EMERGENCY DEPARTMENT (ED) TIME TARGETS: BEST PRACTICE

Best practice for acute stroke patient care in the emergency department is a complex set of time sensitive tasks (Table 2). These tasks involve interdisciplinary teams from multiple specialties who interact at different points during the patient care continuum. The key to optimal outcomes in caring for the acute ischemic stroke patient is process and teamwork from admission (referred to as "Door") to the emergency department to disposition and handoff to the next team.

EMERGENCY DEPARTMENT PROCESS FOR ACUTE STROKE

Triage: Advantages of Prenotification

Patients arrive to the emergency department in two ways. They walk in or arrive by EMS. The call to 911 is the first link in the stroke chain of survival (Table1). Similar to the chain of survival for myocardial infarction (Figure 1), the chain of survival for stroke starts with recognition and calling for help using EMS. Multiple studies have shown when stroke patients come to the emergency department by EMS, prehospital delays are minimized, patients have shorter door to provider times, the time to computerized axial tomography (CT) scan is shorter, and there is an increase use of t-PA (McKinney et al., 2013). For example, in our emergency department, when EMS calls in to report a patient with stroke-like symptoms, the stroke team is activated. This reduces door-to-doctor time, door-to-stroke team, and door-to-CT times. Prenotification by EMS gives us a time period to activate the emergency, radiology, and neurology teams.

Triage: Potential Pitfalls With Walk-in Presentations

The triage nurse at walk-in must recognize and initiate the ED process for acute stroke. The role of the triage nurse in the emergency department is considered an advanced role for the emergency nurse. The Emergency Nurses Association (ENA) sets specific criteria for triage training and recommends the role for experienced emergency nurses who have additional certifications

Table 2. Emergency Department Process for Acute Stroke

Task	Time target
Door to physician	≤10 min
Door to stroke team	≤15 min
Door to CT initiation	≤25 min
Door to CT interpretation	≤45 min
Door to drug (≥80% compliance)	≤60 min
Door to stroke unit admission	≤3 hr

CT = Computerized axial tomography.
Adapted from Jauch et al., 2013, p. 9.