

## Recommendations for Texas Emergency Medical Systems Stroke Triage and Transport

G Cravens, MD, L Speirs, ACNS-BC , A Brown, ACNS-BC

### **Background and Current Practice:**

**Background:** The American Stroke Association estimates 795,000 strokes occur in the United States every year<sup>1</sup>. According to the Centers for Disease Control, 3.0% of the population in Texas had a new or chronic stroke in 2007, roughly 717,000 people<sup>2</sup>. With the aging population across the country, and a 14% stroke rate for people over 80 years old<sup>1</sup>, the expectation is for stroke to maintain current prevalence in the coming years.

Recent studies, such as Revascat, Swift Prime, Escape, Extend IA, and MR Clean, have shown a robust benefit to combining endovascular therapy with intravenous t-PA therapy in a select population of patients<sup>(3-7)</sup>. These studies showed benefit with expertly trained Interventionalists and strict criteria, which made these studies superior to previous studies. While patients had the greatest benefit when treated in less than 6 hours, some studies allowed treatment up to 12 hours<sup>5</sup> from onset of symptoms. Small volumes of patients per center in these studies, averaging approximately 10 patients per center per year, reflects the small number of patients eligible for treatment.

Intravenous t-PA is nationally only given to about 3.5-4.5% of stroke patients annually, 23% of those patients received IV t-PA and were shipped to another hospital<sup>8</sup>. Rapid triage and treatment improves patient outcomes. Receiving tPA within 60 minutes of arrival is the national goal. Similar results were identified in several of the new studies. Some patients improved after receiving IV tPA, negating the need for endovascular treatment, others had vascular variants that excluded them from the treatment. The current estimate is that 1% or less of all stroke patients would qualify for endovascular treatment under the metrics of the recent studies<sup>8</sup>. Several studies did allow for a drip and treat scenario, allowing for PSC centers to administer IV tPA and transfer to the study center for endovascular treatment.

Patients qualifying for endovascular treatment have higher NIHSS and more severe strokes. The recent studies all had median NIHSS of 17<sup>3-7</sup>. All studies only considered those patients with anterior circulation strokes occurring in the internal carotid or middle cerebral arteries. Additional diagnostic screening was completed at the center performing the endovascular therapy.

**Levels of Care:** Texas designates facilities that provide stroke care by levels. Accrediting agencies certify Primary Stroke Centers (PSC) and Comprehensive Stroke Centers (CSC), with Acute Stroke-Ready (ASR) certification coming this summer. Within the past few years, as PSCs

improve process to become CSCs, the line and capabilities has blurred between the two. The Joint Commission added endovascular care to the PSC stroke metrics for certification<sup>9</sup>, acknowledging the advancement of some PSCs. CSCs require advanced capabilities 24/7/365, while PSCs may have limited timeframes to perform endovascular and neurosurgical procedures.

The Texas Department of State Health Services identified 13 CSC, 112 PSC, 11 Support Stroke hospitals<sup>10</sup> with most located in the eastern half of the state.

**Assessment/Triage:** Accuracy for detection of stroke by EMS personnel is 80% or less for severe strokes<sup>11</sup> while at least 20% of strokes are not identified with current assessment tools. Mild stroke identification was much lower<sup>11</sup>. Data was not found on accuracy of ED staff initial assessments. Posterior circulation strokes are difficult to assess with any of the current EMS stroke tools. Trivedi and colleagues<sup>12</sup> found the Cincinnati Stroke Scale (CPSS) more accurate than the Los Angeles Prehospital Assessment (LAPSS or LAMS), but still only modestly accurate at identifying stroke patients<sup>11</sup>. New assessment tools such as BE FAST from Intermountain Health in Utah, Miami Emergency Neurologic Deficit (MEND) assessment and checklist from the University of Miami, Medical Prehospital Assessment for Code Stroke (MedPACS), Recognition of Stroke in the Emergency Room (ROSIER), or a modified National Institutes of Health Stroke Scale (NIHSS) are options for use in prehospital assessment of stroke. Currently, there is not a consensus between RACs as to which assessment tool to use<sup>13</sup>.

**Initial Transport:** Most agencies in Texas provide rapid assessment and transport of stroke patients. Half of the RACs identify a diversion time frame to bypass PSC for CSC, the rest do not address.

**Secondary Transport:** Transporting stroke patients from one facility to another, as a “drip and ship” type protocol, provides the patient with rapid, class 1A therapy to patients, while still considering treatment with the new stent retrievers. Patients with lower NIHSS, or less severe strokes, and those whose clots are susceptible to IV tPA will receive care at “local” stroke centers. Patients with larger volume, more severe strokes, can be transported to centers capable of endovascular treatment, as long as it does not extend the time to overall treatment.

A. Length of time from onset – 6 hours – 3 of 5 studies used the 6 hour time frame; all demonstrated sooner the better; none of the studies included posterior circulation strokes – which are historically known for extending time frames for lifesaving measures.

*Reasons: Extend IA, MR CLEAN, and SWIFT PRIME studies only used 6 hours from onset to treatment<sup>4,6,7</sup> with Solitaire devices. While FDA approval is expected at some time in the future for endovascular stroke treatment, IV tPA is still the gold standard for stroke care and widely available across rural and urban areas of Texas. In areas where CSCs are available, extension of the time frame is foreseeable.*

B. Bypassing PSC centers for CSC centers – <15-20 minutes transport time to CSC, otherwise, nearest facility capable of giving tPA (may be a Stroke Ready).

*Reasons: Initial guidelines for stroke systems of care identified bypassing non-stroke center hospitals if the transport time does not exceed 15-20 minutes additional time<sup>14</sup>. Since the recently published studies also indicated outcomes improve with early treatment<sup>3-7</sup>, delaying care for patients with stroke-like symptoms more than 20 minutes contradicts the Class 1, level A evidence<sup>14</sup>. Care of the most severe stroke patients should be managed at the highest level stroke center available in the area<sup>15</sup>.*

C. Consensus of prehospital stroke assessment tool

*Reasons: Developing a statewide stroke system of care, with EMS triaging patients to several levels of stroke service, should encompass a standard tool to identify potential stroke patients and assess the level of severity for those patients. Evidence is limited between the numerous stroke assessment tools available for EMS use. Perhaps a research project to compare tools is the first step.*

D. Develop a process to identify PSCs capable of advanced stroke care, CSC hospitals, and those hospitals able to give IV tPA. Process will need to be fluid as hospitals gain (or lose) status/capabilities.

*Reasons: Rapid changes in technology, treatments, and capabilities are expected to continue over the next several years. PSCs may move toward CSC status, providing limited surgical and endovascular care. EMS providers need to have the most current information at their disposal to make decisions regarding transportation of patients.*

E. Develop a Secondary transport protocol to rapidly move patients from Stroke Ready and PSC to CSC as needed. Patients treated with IV tPA may improve, negating need to move, hemorrhagic stroke patients may or may not need to be transferred.

*Reasons: Only those patients with ischemic strokes in larger vessels, with accessible arteries can benefit from endovascular therapy. Hemorrhagic strokes, small vessel, small volume and well defined strokes do not benefit from the newer treatments. Some ischemic strokes may improve dramatically from IV tPA, negating the need for further treatment.*

*Once a patient is diagnosed and treated at a PSC or ASR hospital, that facility's staff may determine the patient is a potential candidate for endovascular treatment; as patient's are currently transported to PSCs and CSCs from non-stroke hospitals for care after receiving IV tPA. Rapid transport between hospitals is the key to extending the current resources in Texas and allowing continual improvement in care.*

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