

BRAIN ATTACK

THE EMD'S ROLE IN RECOGNIZING STROKE & ENSURING A TIMELY RESPONSE

BY STEVEN McDADE, REMT-P, RPL, CHS

The telecommunicator answers a 9-1-1 call. A female voice starts frantically describing her husband's symptoms. Through proper use of the All Callers Interrogation EMD Guidecard, she determines the male is possibly suffering from a stroke. The last time he presented with normal signs and symptoms was 45 minutes prior to the 9-1-1 call. An advanced life support ambulance (ALS) is dispatched within one minute and en route within two minutes. The EMS providers arrive on scene within eight minutes of the initial 9-1-1 call. The responders know it takes 30 minutes to get to the nearest *Stroke Center* from this location by ground or eight minutes by air.

Are these times important to the 9-1-1 telecommunicator? Is there a difference between the local emergency department (ED) and an ED that's also designated as a *Stroke Center*? What importance does time have in the event of a stroke?

Years ago we were introduced to the term *heart attack* for the description of someone experiencing a myocardial infarction. Through public education and extensive training, emergency medical dispatchers (EMDs) and field personnel learned to recognize and treat the signs and symptoms of a heart attack. More important, we came to understand that time wasted is in fact tissue damage and means death for the heart muscle. The same principle holds true for stroke victims: Time = Brain Function. We must treat stroke-like symptoms as a *brain attack*.

Several recent studies have demonstrated that the majority of strokes, or brain attacks, should be treated with the same urgency as if the patient is

having a heart attack.¹ Getting to the right hospital in the right time frame—within three hours of onset—can greatly minimize the long-term disability a stroke can cause.

THE STATS

Each year, nearly 800,000 people suffer a stroke. And brain attack is the third leading cause of deaths and the most common cause of disability in the United States.² Stroke can cause significant disability, including paralysis, speech and emotional problems. Among stroke patients, one-third will die, one-third will be disabled and one-third will experience little or no disability. Approximately 25% of those who recover from a stroke will have another stroke within five years. New treatments are available that can reduce the damage caused by a stroke for some victims, but these treatments need to be given soon after symptoms start.

The direct and indirect medical costs associated with a stroke will reach almost \$69 billion in 2009, according to the American Heart Association.³ The average cost per patient for the first 90 days after a stroke is \$15,000, although 10% of those cases exceed \$35,000.⁴

SIGNS, SYMPTOMS & TREATMENT

A stroke occurs when the blood supply is suddenly cut off to part of the brain or when a blood vessel in the brain bursts and blood spills out around the brain cells. Thus, patients may present with either an ischemic or a hemorrhagic stroke, respectively (see Figure 1). Ischemic strokes account for

Figure 1: Differentiating Ischemic & Hemorrhagic Stroke

Ischemic Stroke	Hemorrhagic Stroke
Most common	Least common
Usually results from atherosclerosis or a tumor within the brain	Usually results from hypertension or a cerebral aneurysm
Slow to develop	Develop abruptly
Patient typically has a history of vessel disease	Often occur during stress or exertion
May be associated with atrial fibrillation	May be associated with drug or alcohol abuse
Patient typically has a history of angina or previous TIA/strokes	May be asymptomatic prior to rupture

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approximately 80% of all brain attacks, with hemorrhagic strokes accounting for the remaining 20%.⁵ Hemorrhagic strokes can further be classified as intracerebral (12%) and subarachnoid (8%).

The most common cause of an ischemic stroke is a blood clot that forms in the vascular system. A clot can form anywhere in the body; if it travels up and plugs a cerebral artery, it's called a thromboembolism. Possible origins of the clot are the heart, the large artery that supplies blood to the brain, a small artery

or the blood itself crossing the blood-brain barrier.

The most common cause of an intracerebral hemorrhage is chronic hypertension, while the most common cause for a subarachnoid hemorrhage is an aneurysm rupture.

Callers may describe several signs and symptoms that indicate stroke.⁶ These include sudden numbness or weakness of their face, arm or leg, especially on one side of the body; sudden confusion or trouble speaking or understanding; sud-


den trouble seeing in one or both eyes; sudden trouble walking, dizziness or loss of balance or coordination; and sudden severe headache with no known cause. Other warning signs are double vision, drowsiness, and nausea or vomiting.

For treatment purposes, the remainder of this discussion will focus on the ischemic stroke. It is the most common, associated with 80% of all brain attacks, and is the one we can treat more successfully.

There are many risk factors associated with brain attacks; some are modifiable and some are not. Risk factors that are not modifiable include advanced age, male gender and family history of myocardial infarction or early stroke. Those risk factors that are modifiable include hypertension (systolic and diastolic), diabetes mellitus, hypercholesterolemia, cigarette smoking, prior stroke/transient ischemic attacks (TIAs or mini strokes), carotid disease, heart disease (especially atrial fibrillation), hypercoagulable states and drug/alcohol abuse.


Where should treatment be centered? On the *penumbra*, a zone of reversible ischemia around the core of irreversible infarction. The penumbra is salvageable in the first few hours after the onset of an ischemic stroke. Because you can't determine by exam how much of the brain can still be saved, treatment should be centered on a common chain of survival.⁷ That chain of survival comprises the seven Ds:

- 1. Detection:** Stroke onset.
- 2. Dispatch:** EMS activation and response.
- 3. Delivery:** Prehospital care to hospital (exam should include the Cincinnati Prehospital Stroke Scale, the National Institutes of Health Stroke Scale and/or the Miami Emergency Neurologic Deficit [MEND] Prehospital Checklist).
- 4. Door:** ED triage.
- 5. Data:** ED evaluation; CT scan.
- 6. Decision:** If the patient is a candidate and it's less than three hours from symptom onset, consider thrombolytic therapy.
- 7. Drug:** Thrombolytic therapy can reduce the risk of disability by 30% but must be given within three hours of symptom onset.



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THE EMD'S RESPONSIBILITIES

What's the 9-1-1 telecommunicator's role in a brain attack? Our role should be centered on the first three Ds. To assist with detection, we need to ensure telecommunicators are trained and certified in EMD. Nothing can take the place of training. A key to minimizing long-term disabilities and even death is getting the patient to an appropriate care facility within three hours of the onset of signs and symptoms. The EMD must ask the proper vital point questions to determine the true medical emergency and its onset.

We need to know when the patient last presented *without* signs and symptoms. Utilizing this method helps minimize confusion about the timing of the stroke's onset, and it's the best way to determine if the patient is within the targeted three-hour window for drug therapy. It's vital to remember that the caller may have difficulty focusing because of the telescoping of time and the emotions involved, but we (9-1-1, EMS and hospital) need that critical information to be most effective in detection.

Obviously, if our 9-1-1 telecommunicators are trained properly as EMDs and can detect that the patient or caller may be experiencing a brain attack, the telecommunicator will take the next critical step: *dispatching* the proper EMS unit(s).

Through proper pre-arrival instructions and assessment of the patient by field personnel the *delivery* section of the seven Ds is initiated. From this point, delivery includes making sure that we know where the patient should go.

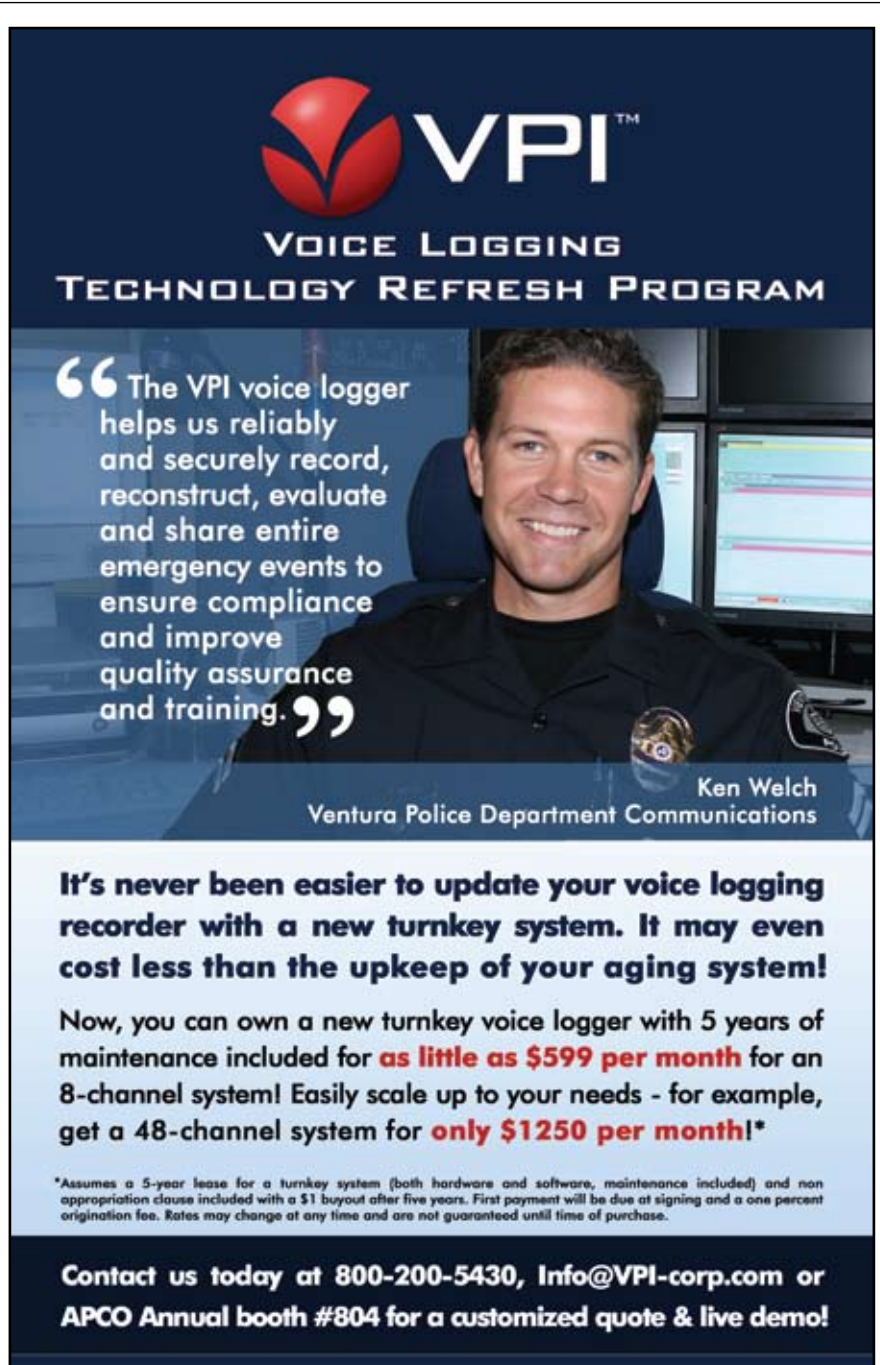
What is the most appropriate facility for our patient? Similar to the classification of Trauma Centers and Heart Centers, hospitals can also be classified as Stroke Centers. This step is a critical piece of the puzzle because it ensures the patient receives the most appropriate care. The locations of and travel time to these specialty centers must be included in EMD training. This is also important because if we identify the best receiving destination for the patient, we will be able to determine where they should be transported and if it should be by ground or air.

The need for a speedy response is dictated by the drug used to treat ischemic

strokes: t-PA. According to the NINDS Web site, "The window of opportunity to use t-PA to treat stroke patients is three hours, but to be evaluated and receive treatment, patients need to get to the hospital within 60 minutes. A five-year clinical trial conducted by NINDS found that selected stroke patients who received t-PA within three hours of the onset of stroke symptoms were at least 30% more likely than placebo patients to recover from their stroke with little or no disability after three months."⁸

CONCLUSION

In the past, we may not have given much thought to our role as it relates to the patient suffering a brain attack, but as research and science continue to develop, it's evident that as 9-1-1 health-care professionals and "the first of first responders" we are the first link in the chain of survival. We must stay abreast of current information to ensure we stay a strong link to the survival of the patient, all the while doing our best to minimize long-term disabilities and possibly prevent death.



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So, what about the 9-1-1 call for the husband who was experiencing a brain attack? At the end of the day, time was a critical factor in the treatment and outcome of this patient. Thanks to proper questioning and appropriate dispatch procedures, our patient reached a Stroke Center within the three-hour window and was administered thrombolytic therapy following a CT scan and the ruling out of any contraindications. As a result, he was discharged four days later without any disability.

Think about how the outcome could have been different. If the 9-1-1 telecommunicator had not been trained in EMD

or had not followed the correct procedures, what would have happened? ||PSC||

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RESOURCES

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1. Strokes or brain attacks account for approximately what percentage of deaths a year in the U.S.?
 - a. 12%
 - b. 20%
 - c. 33%
 - d. 45%

2. What is the leading cause of disability in the U.S.?
 - a. Heart attack
 - b. Drowning
 - c. Brain attack
 - d. Motor vehicle accident

3. _____ is the most common stroke type, accounting for 80%.
 - a. Ischemic
 - b. Hemorrhagic

4. When a blood clot travels up and blocks a cerebral artery, it is _____.
 - a. Ischemic
 - b. Hemorrhagic

5. Which type of stroke usually results from hypertension or cerebral aneurysm?
 - a. Ischemic
 - b. Hemorrhagic

6. Which type is slow to develop?
 - a. Ischemic
 - b. Hemorrhagic

7. Which type often occurs during stress or exertion?
 - a. Ischemic
 - b. Hemorrhagic

8. Which type can be treated more effectively?
 - a. Ischemic
 - b. Hemorrhagic

9. The 7th “D” is:
 - a. Dispatch
 - b. Delivery
 - c. Drug
 - d. Door

10. The importance of time in the event of a brain attack is similar to that of a:
 - a. Snake bite
 - b. Heart attack
 - c. Motor vehicle accident
 - d. Drowning

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