

EM CASE OF THE WEEK.

BROWARD HEALTH MEDICAL CENTER
DEPARTMENT OF EMERGENCY MEDICINE



Care Warriors

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Vol 4 | Issue 15

Acute Stroke

A 86 year old female with a history of atrial fibrillation s/p TEE cardioversion 2 days ago and currently on Rivaroxaban (Xarelto) presents to the emergency department via EMS as a trauma alert after a witnessed fall. EMS noted left sided weakness and a hematoma. Upon arrival her vitals are stable. On physical examination, she has a 4cm left sided hematoma, right upward gaze deviation, left sided facial droop, slurred speech, left arm and leg weakness, and she is in atrial fibrillation. Last known to be normal at 7 hours ago. Which of the following is the most appropriate next step in caring for this patient's condition?

- A. Administration of tPA
- B. Uncontrasted CT scan of the brain
- C. Contrasted computed tomography (CT) scan of the brain
- D. Brain magnetic resonance imaging (MRI) with gadolinium
- E. Rapid sequence intubation

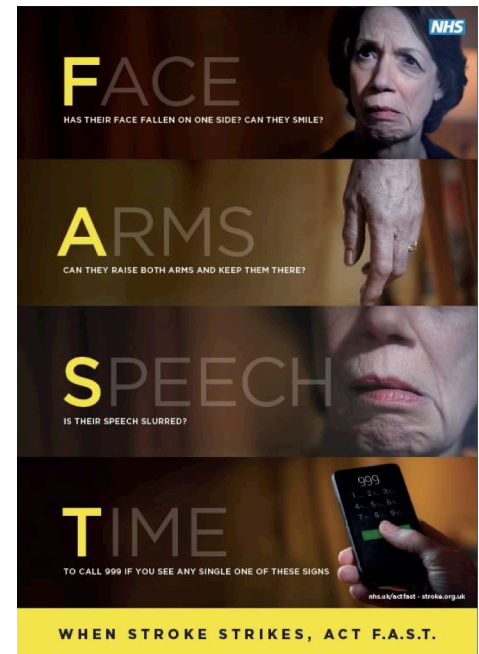


Image: Symptoms that indicate a possible stroke that require quick intervention.

EM Case of the Week is a weekly "pop quiz" for ED staff.

The goal is to educate all ED personnel by sharing common pearls and pitfalls involving the care of ED patients. We intend on providing better patient care through better education for our nurses and staff.

BROWARD HEALTH MEDICAL CENTER

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The correct answer is B. After further examination, it can be determined that a stroke needs to be ruled out in this patient.

An emergent noncontrast cranial CT is the standard initial imaging technique for evaluating a patient with a potential stroke. It can differentiate an ischemic stroke from intracranial hemorrhage and other mass lesions. Differentiating is critical for determining subsequent therapeutic decisions.

A CT scan can identify almost all parenchymal hemorrhages greater than 1 cm in diameter and it has a high sensitivity for the detection of a subarachnoid hemorrhage (SAH). In a majority of ischemic strokes, gross signs of infarction may not appear on routine CT scans for at least 6 to 12 hours. However, subtle ischemic changes have been noted in up to 67% of noncontrast CT scans within the first 3 hours. Early ischemic changes include the hyperdense artery sign indicating an acute thrombus in a vessel, sulcal effacement, loss of the insular ribbon, loss of gray-white interface, mass effect, and acute hypodensity.

Introduction

In the USA, 795,000 people experience strokes yearly. Approximately one stroke every 40 seconds. Of these events, 77% are primary strokes, whereas 23% represent recurrent strokes. A *stroke* is any vascular injury that reduces blood flow to a specific region of the brain, retina, or spinal cord causing neurologic impairment. The onset of symptoms may be sudden or slowly. Most (87%) strokes are ischemic, caused by the occlusion of a cerebral vessel or hypoperfusion. Hemorrhagic strokes are caused by the rupture of a blood vessel into the parenchyma of the brain or into the subarachnoid space.

Prehospital Care

EMS should determine risk with scales such as the Cincinnati Prehospital Stroke Scale, the Los Angeles Prehospital Stroke Screen, and the Melbourne Ambulance Stroke Screen. They should also ensure CNS oxygenation and perfusion, rapid identification, early hospital notification, and rapid transport.

Stroke mimics

Seizures (Todd's paralysis)	Hypertensive encephalopathy
Syncope	Wernicke's encephalopathy
Meningitis/encephalitis	Drug toxicity
Brain neoplasm	Bell's palsy
Hypoglycemia	Demyelinating disease
Hyponatremia	Conversion disorder

Clinical Features:

It is important to identify clinical features early on that indicate a possible stroke. These include facial droop, arm drift, hand grip weakness, abnormal speech, altered mental status.

Initial Diagnostic Evaluation: "TIME IS BRAIN"

The current American Heart Association/American Stroke Association stroke guidelines recommend a protocol to evaluate and decide treatment within 60 minutes of patient's arrival in an ED.

Core ED interventions:

Assessment of airway, breathing, and circulation, obtaining IV access, oxygen administration, cardiac monitoring, bedside glucose, pulse ox, EKG, CBC, coagulation studies, CMP, cardiac enzymes, NPO, bed rest, and a noncontrast CT within 25 minutes of arrival. In ischemic strokes, CTA can be used to identify the presence of intravascular thrombosis, vasculature dissection, or stenosis. In cases in which arterial dissection is suspected, imaging with MRA or CTA is indicated.

Management Component	Target Time Frame
Door to doctor	10 minutes
Door to CT completion	25 minutes
Door to CT scan reading	45 minutes
Door to treatment	60 minutes
Access to neurologic expertise	15 minutes
Access to neurosurgical expertise	2 hours

For a list of educational lectures, grand rounds, workshops, and didactics please visit BrowardER.com and **click** on the **"Conference"** link.

All are welcome to attend!

Warriors

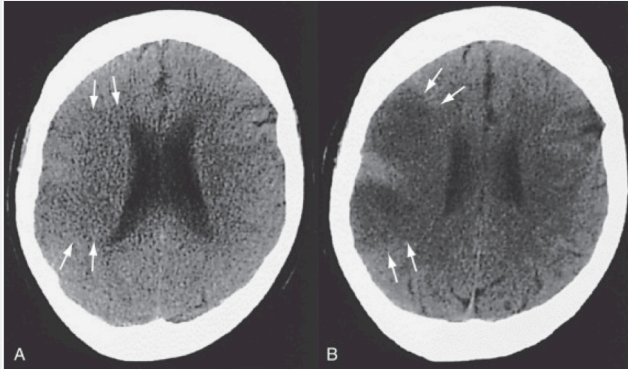


Image A: CT scan taken 3hrs after a large right MCA occlusion. Subtle, early ischemic changes include loss of the gray-white interface and sulcal effacement.

Image B: CT scan of same patient 8hrs after symptom onset shows acute hypodensity and more sulcal effacement.



ABOUT THE AUTHOR

This month's case was written by Krina Amin. Krina is a 4th year medical student from NSU-COM. She did her emergency medicine rotation at Broward Health North in September 2017. Krina plans on pursuing a career in Pediatrics after graduation.

Management

Dehydration	Contributes to poor stroke outcomes. Correct dehydration with IV isotonic crystalloid.
Hypoxia	Maintain oxygen saturation >94%
Hyperpyrexia	Associated with increased morbidity and mortality in stroke. Identify the source of fever and treat with acetaminophen.
Hypertension in patients not candidates for tPA	Permissive hypertension, with no active attempts made to lower blood pressure unless the systolic is >220 mm Hg or the diastolic is >120 mm Hg or if the patient has another medical condition that would benefit from lowering blood pressure. If blood pressure control is started, a suggested target is a 15% reduction in systolic blood pressure for the first 24 hours.
Hypertension in patients that are candidates for tPA	Systolic >185 mm Hg or a diastolic >110 mm Hg is a contraindication to the use of tPA because elevated BP is associated with hemorrhagic transformation of ischemic stroke. If a patient is a candidate for tPA, actively attempt to lower BP to meet these parameters.
Hyperglycemia	Maintain blood glucose from 140 milligrams/dL to 180 milligrams/dL. Avoid, and treat, hypoglycemia

For eligible patients tPA is first-line therapy provided that it is initiated within 4.5hrs of clearly defined symptom onset. Patients with a large artery occlusion presenting within 6hrs or when tPA is not indicated should receive a thrombectomy. Some exclusion criteria of tPA includes stroke/head trauma in previous 3mo, previous ICH, intracranial neoplasm, AV malformation, aneurysm, persistent BP elevation about 185/110, serum glucose <50, internal bleeding, INR >1.7 or PT >15s, heparin use within 48hrs and an abnormally elevated aPTT, current use of a direct thrombin inhibitor or factor Xa inhibitor with evidence of anticoagulant effect by lab tests, and evidence of hemorrhage on CT.

Take Home Point

- Main goals in initial acute stroke management include medical stability, quickly reversing conditions contributing to the patient's problem, and determining if patients with an acute ischemic stroke are candidates for thrombolytic therapy.

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