

EM CASE OF THE WEEK

BROWARD HEALTH MEDICAL CENTER: DEPARTMENT OF EMERGENCY MEDICINE

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Figure 1. CT scan of the brain without contrast showing a left-hemispheric ischemic stroke, likely of the MCA. (Credit: Wikimedia Commons, Lucien Monfils)

EM CASE OF THE WEEK

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.



Stroke: Criteria for tPA

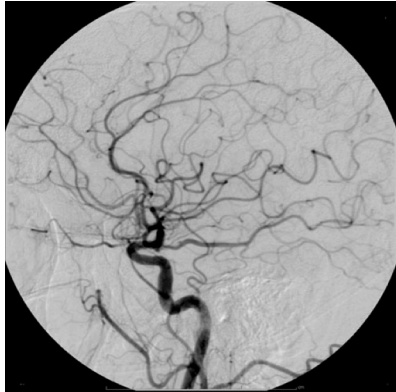
A 91 year old male with a history of hypertension and atrial fibrillation presents to the emergency department with aphasia and right sided hemiparesis. According to his daughter, he was last seen awake and without any stroke symptoms about 3 hours prior. He also does not take any anticoagulation medications. His vital signs are: Temp 97.0°F, HR 65, RR 13, BP 137/72 mmHg, and O2 sat of 97% on room air. His NIH Stroke Scale score is 25. His EKG shows normal sinus rhythm with a nonspecific t-wave abnormality. CT brain shows decreased attenuation in the area consistent with the left middle cerebral artery. Interventional neuroradiology was paged.

Which of the parameters in this case is an exclusion factor for administering tPA in the 3-4.5 hour window?

- A. History of paroxysmal atrial fibrillation.
- B. Age > 80.
- C. NIHSS score of 25.
- D. CT results.



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Take Home Points

- Time is brain! The sooner stroke symptoms are recognized and an intervention enacted, the more brain tissue salvaged.
- Number needed to treat within the first 2 hours from onset of symptoms is 2!
- Be aware of a possible symptomatic ICH after administration of tPA. The mortality rate of patients who develop this complication is 45%!

tPA Administration in Acute Ischemic Stroke

The correct answer is B.

Discussion:

There are two major studies that were used to establish the guidelines for the use of IV tPA as an intervention for acute ischemic stroke: The National Institute of Neurological Disorders and Stroke study (NINDS) in 1995, and the European Cooperative Acute Stroke Study III (ECASS III) in 2008. NINDS showed a significant long term benefit for patients receiving tPA **within 3 hours** of showing signs of stroke, with a deficit measurable on the NIHSS scale, and who had no evidence on CT of intracerebral hemorrhage. The ECASS III trial showed that patients who received tPA **3-4.5 hours** after onset of stroke showed significantly improved functional outcomes at 3 months.

The most important factor in successful thrombolytic therapy is early treatment. However, one must first determine if tPA is an appropriate intervention for a possible stroke patient by obtaining a neurologic evaluation (NIH Stroke Scale), CT of the brain without contrast, PT/INR, aPTT, platelet count, blood glucose, and a relevant history if possible.

The dose of alteplase (tPA) is 0.9 mg/kg, with 10% given as an IV bolus and the other 90% as an IV infusion over 1 hour.

A significant adverse effect that can occur with tPA use is a symptomatic intracerebral hemorrhage. It should be suspected in any patient who develops sudden neurologic deterioration, a decline in level of consciousness, new headache, nausea and vomiting, or a sudden rise in blood pressure after thrombolytic therapy is administered, especially within the first 24 hours of treatment. The tPA should be stopped and prompt non-contrast CT brain is needed for confirmation and management. Type and cross-match, PTT/INR, platelets, and serum fibrinogen levels should all be ordered immediately.

After looking at the inclusion/exclusion criteria on the next page, do you think our patient should get tPA?

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and click on the "Conference" link. All are welcome to attend!

NINDS Criteria*Inclusion:*

- Acute ischemic stroke with clearly defined time of onset (who could be treated < **3 hours** from symptom onset)
- Measurable deficit on the NIHSS
- Baseline brain CT scan that showed no evidence of hemorrhage

Exclusion (Absolute):

- Another stroke or serious head injury within the preceding 3 months
- History of intracranial hemorrhage
- Systolic BP > 185 or diastolic BP > 100 mmHg
- Symptoms suggestive of subarachnoid hemorrhage
- Arterial puncture at a noncompressible site within previous 7 days
- Use of anticoagulation:
 - o Patients receiving heparin within the 48 hours preceding the onset of stroke who have an elevated PTT
 - o Patients with a PT > 15 seconds (or INR > 1.6)
 - o Patients with a platelet count < 100,000
- Glucose level of < 50 or > 400

Other Absolute Exclusions:

- Pregnancy and early postpartum period
- Known bleeding diathesis, recent pericarditis, recent lumbar puncture (Brain Attack Coalition)

ECASS III Criteria*Inclusion:*

- Acute ischemic stroke with a clearly defined time of onset (who could be treated between **3-4.5 hours** from symptom onset)
- Age 18-80 years
- Stroke symptoms present for at least 30 minutes without significant improvement prior to treatment
- Baseline brain imaging that showed no evidence of hemorrhage

Exclusion (Absolute):

Same as NINDS plus:

- Appropriate imaging techniques showing > 1/3 of the middle cerebral artery territory

Relative Exclusions:

- ECASS III
 - o Age >80 years
 - o Severe stroke (NIHSS >25)
 - o Combination of previous stroke and diabetes mellitus
 - o Any oral anticoagulant use (regardless of INR or PT)
- NINDS
 - o Major surgery within prior 14 days
 - o GI or GU hemorrhage within previous 21 days
 - o Rapidly improving or minor symptoms
- MI within previous 3 months (AHA 2007 guidelines)

**ABOUT THE AUTHOR:**

This month's case was written by Antonious Fawzy. Antonious is a 4th year medical student from NSU-COM. He did his emergency medicine rotation at BHMC in August 2015. Antonious plans on pursuing a career in Emergency Medicine after graduation.