
Ali Grubbs, RN BSN
Clinical Staff Leader
VUMC Adult Emergency Department
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Vanderbilt Adult Emergency Department

- Patient Population:
  - STROKE
  - STEMI
  - SEPSIS
  - TRAUMA
  - BURN
  - PHSYCH
  - ORTHO
  - PLASTICS
  - OB/PEDS
  - CLINIC/FAST TRACK
  - GENERALIZED ILLNESS
  - ........AND THE LIST GOES ON......
Narrowing the Focus

- How do we focus and sort through the many patients we see everyday to determine who is the most severe???
Rule Out Stroke Patients

Signs and Symptoms Of Stroke

- Sudden unilateral numbness of the face, arm or leg
- Sudden unilateral weakness of the face, arm or leg
- Sudden trouble seeing in one or both eyes
- Sudden trouble walking
- Sudden severe headache with no known cause
- Trouble speaking or understanding
- Loss of balance or coordination
- Dizziness
- Sudden Confusion
Identification

- Does the patient show/express signs and symptoms of stroke?

TIME LOST IS BRAIN LOST
What Is A “Code Stroke” Alert?

A code stroke alert is activated anytime a patient with signs or symptoms of stroke/TIA presents to VUMC within 8 hours of symptom onset.
What is a **CODE STROKE**?

**Code Stroke** activation allows members of the **Code Stroke** team to quickly mobilize to the E.D. so that treatment of the acute stroke patient can begin as soon as possible.
Identification and Mobilization
It takes a TEAM!

- Prehospital Providers
  - Air Medical (Life Flight)
  - EMS
- Emergency Room
  - Nurses
  - Emergency Medicine Physicians
  - Radiology/CT Technicians
  - Paramedics
  - Patient Care Technicians
  - Registration Staff
- Neurology
  - Neurology Physicians
  - Neurology Nurses
    - 6 CCT and 6 North
Identification and Mobilization

• Patients who present from Triage
  • Patient is triaged by triage staff who then alerts a physician of potential rule out stroke/code stroke patients.
  • Information gathered in triage (in relation specifically to stroke patients) includes:
    • Chief complaint
    • Signs and symptoms
    • Symptom onset (last seen normal)
    • Vital signs
    • Bedside glucose and iSTAT
  • The patient is then taken directly to the CT scanner while the charge/flow nurse arranges bed placement.
  • After the scan is complete, the pt goes to their ED room where their workup is continued.
Identification and Mobilization

- Patients from prehospital providers
  - Pt goes directly to CT
  - Based on report, a code stroke may be called ahead of time, which enables the members of the ED as well as the code stroke team to meet in the scanner.
Identification and Mobilization

- If it is feasible and does not prolong the CT scan, an IV may be placed (if one is not already in place) and labs may be drawn during transfer and positioning of pt for scan.
- Although the EMS or flight crew may have already obtained a glucose, we still do an accucheck on every rule out/code stroke patient.
- The charge/flow nurse has already arranged an ED bed for the patient and so they go to that room after the scan is complete where their workup is continued.
- Obtain report from the EMS provider including referring hospital records. Be sure to inquire about specifics. If the pt is actively receiving a tPA infusion, ask about the following things:
  - Ordered dose
  - Bolus dose (was it given, how much, when)
  - Infusion dose (what is the dose, where is the pt in the 60 minute infusion time)
Continued Monitoring

- All patients are to remain on a portable cardiac monitor (MRX) for their entire stay in the ED.
- Vitals signs and Neuro checks are to be continued throughout all testing and procedures.
- The patient should be transported on a MRX monitor by the primary RN, float RN, or Paramedic who can continue to perform these checks and monitor vitals.
Even though the patient is currently in the emergency department, it is important to alert the **Code Stroke** team so that initial workup and decisions about treatment options can be made as quickly as possible.
Time Lost Is Brain Lost

- Remember that there is only a 3-4.5 hour window from the time of symptom onset during which IV tPA may be considered to be administered.

- The window for Interventional therapy is less than or equal to eight hours from symptom onset.

- When obtaining information from family members, ask “when was the last time the patient was seen NORMAL?”
How does all of this work???

The Stroke Experts for the hospital developed a stroke protocol for the ED to help ensure that the process for acute stroke patients is smooth and streamlined…
ED Acute Stroke Algorithm

START

Patient enters ED with suspected stroke symptoms

Stroke Alert Protocol Activated

Immediate NCCT

If needed, pause for IV, labs and/or quick neuro assessment (5 min limit)

CTA/CTP

Option to delay/cancel CTA/CTP per Neurology

Note: if sig deficit, no ct scan needed

Case Reviewed with Neurology Attending

PARALLEL PRIORITY TASKS:
- ABC assessment
- VS assessment
- Clinical Assessment (not to delay CT)
- IV access (large bore) & blood draw for stroke alert labs (not to delay CT)

PAGE 1

“Stroke Alert: location, Physician @ Phone Number, Age, Gender, MRN”

PAGE 2

(assessment Page)
- “Stroke alert update: location, cancel”
- “Stroke alert update: location, NIHSS, MRN, Attending Neurologist name”

If NIHSS ≥ 6, Interventionist calls Neurology Attg (5 mins)
If NIHSS < 6, Neurology Attg calls Interventionist PRN

PAGE 3

(Treatment Page)
- “Stroke Alert Update: location, No Treatment”
- “Stroke Alert Update: location, IV tPA”
- “Stroke Alert Update: location, IA therapy”
- “Stroke Alert Update: location, IV tPA plus IA”

No Acute Intervention

FINISH

ED Team:
1) Early identification of specific geographic location or working telephone number for family contact

Approved February 2013 by Stroke Team

Time Goals:
- 15 minutes to neuro at bed and Assessment Page
- 30 minutes to IV tPA
- 45 minutes to Out of ED

Neurology Sr Resident directs Stroke Alert:
1) Identify themselves to ED team and RN (establish primary RN contact): “I am the Neurology Resident directing this stroke alert”
2) Obtain NIHSS → Assessment Page
3) Discuss with Attg → Treatment Page
4) Place order for IV tPA
5) Communicate plan to ED team and RN
6) For all NICU admits, communicate plan to Neuro NP (498-5-298)
7) Facilitate transfer to ICU, Floor, or IA suite as rapidly as possible
8) For each patient consider candidacy for stroke trials

CALL: Wake up, unknown time or <8 hours

The algorithm remains in effect for all appropriate cases, even when 2 or more present simultaneously. This is possible due to the availability of providers and imaging equipment.
As a TJC Primary Stroke Center, we are given a window of 45 minutes from the time that the order is written for the initial imaging scan on an acute stroke patient (non-contrast CT head) until it is completed and interpreted and a treatment decision is made.
What Is My Role In A Code Stroke?

- Recognize the signs and symptoms of acute stroke
- Assist in getting the initial imaging study completed in a timely fashion
- Draw the blood for the ordered lab work as quickly as possible (use the button in the room to call for assistance if you need additional help in getting blood drawn quickly) and document the time blood is drawn
As a TJC Primary Stroke Center we are given a window of **less than 45 minutes** from the time that the acute stroke patient has orders entered for lab work until the initial lab work is drawn and the results are made available.
What Is My Role In A Code Stroke?

- Place the blood tubes in a biohazard bag with an purple sticker on it as this will alert the laboratory that this blood is to be run ahead of any other STAT bloodwork received at the same time.

- Tube the biohazard bag with the blood tubes to the laboratory immediately.
What Is My Role In A Code Stroke?

ALL rule out/code stroke patients are to be kept NPO (which includes no po medications) until a swallow screening is complete!!
What do you document????

EVERYTHING
ACUTE ISCHEMIC STROKE WORKSHEET >>> Adult ED

Clock icon: Arrival (Door): Ambulatory______ EMS______ Lifeflight______

Clock icon: CodeStroke Activation by:______________

O2 bnc to keep SaO2 >92%, (continuous cardiac monitor/NIBP/SaO2)

STAT bedside glucose, if not done *NPO until swallow screen completed!

IV access x2 (one IV lock, one NS….rate per MD order)

STAT EKG & labs (cbc, platelet count, PT/PTT, INR, chemistries, lipid profile)

**anticipate possible cardiac enzymes, tox screen, type/screen, ABGs, liver function, blood alcohol, urine pregnancy if pt of childbearing years)

»»»Send labs specimens in biohazard bags with STROKE label!!
What Is My Role In A Code Stroke?

Document:

- What time your patient gets to their room
- Code stroke activation time
- Presenting stroke symptoms
- Date and time of symptom onset
- What time the stroke team arrives to see patient
- Be sure to obtain correct weight on triage form
- What time your patient goes to CT
- What time your patient returns from CT
What Is My Role In A Code Stroke?

**Document:**

- Time of blood draw for labs
- If tPA indicated, make sure you are documenting patient weight; dosage given (including bolus amount, drip amount and waste), VS & neuro status along with any adverse reactions that may occur after the infusion begins
- Other pertinent data i.e. intubation times, changes in condition, blood glucose, etc.
This is now a permanent part of the patients chart!

- This is only a guide to ensure correct documentation on all code stroke patients.
- Scan the Code Stroke Form promptly into star panel after patient is stable or transferred to the Neuro ICU.
- Be sure you sign the form on both sides and that your signature is legible. You may want to also print your name to ensure this.
Alteplase (tPA)

- **Indications**
  - Alteplase (tPA) is indicated for the management of acute ischemic stroke in adults for improving neurologic recovery and reducing the incidence of disability.
  - Treatments should only be initiated after exclusion of intracranial hemorrhage by CT-Scan or other diagnostic imaging methods sensitive for the presence of hemorrhage.
IV tPA: High Alert Medication

- IV tPA is now a high-alert medication at VUMC which means that staff should follow safety strategies and defined procedures during all steps in the medication use process in order to minimize risk.
- Being a High Alert medication means that IV tPA bears a heightened risk of causing significant patient harm when used in error.
- Administration of IV tPA as a high alert drug involves:
  - Primary nurse verifies drug indication corresponds to patient diagnosis and appropriate monitoring has been reviewed
  - Two licensed staff will verify the following prior to administration of IV tPA:
    - Drug and dose based on patient weight
    - Amount of waste
    - Amount of bolus to be administered over one minute
    - Amount of IV infusion via infusion pump to be administered over one hour
    - Primary nurse will verify waste amount withdrawn from vial followed by bolus dose withdrawn from vial followed by infusion dose administered via infusion pump
    - Primary nurse will document waste amount and name of second licensed staff member who witnessed waste, bolus dose amount and time administered and infusion dose amount and time initiated in EMR.

**Review the Policy: High Alert and Look-Alike Sound-Alike Medications CL 30-06.26**
https://mcapps.mc.vanderbilt.edu/E-Manual/Hpolicy.net/AllDocs/DA7A899D84615A4C862577AF0747227
Mechanism of Action

- **Onset**
  - Clot lysis often occurs within 60 – 90 minutes of administration

- **Duration**
  - ½ an hour
  - 80% cleared within 10 minutes of administration
Inclusion/Eligibility Criteria for tPA Administration

- Age 18 years of age or older (or at discretion of stroke team neurologist).
- Signs of a measurable neurologic deficit from an ischemic stroke on examination and/or measureable on NIHSS.
- Time of onset less than or equal to three hours. Currently, the FDA has approved the use of IV tPA for patients up to three hours after stroke symptom onset. The ECASE III trial results released in the Spring of 2009 showed comparable outcomes when IV tPA was given in the extended 3-4.5 hour window with some additional contraindications noted. We do administer IV tPA in the extended time window at VUMC when applicable or appropriate.
- Baseline CT scan with no evidence of Intracranial Hemorrhage.
Exclusion/Contraindications Criteria for IV tPA

- Evidence of intracranial hemorrhage on pretreatment CT-scan.
- Minor or rapidly improving symptoms (treatment considered at the discretion of the stroke team neurologist)
- Clinical Presentation suggestive of subarachnoid hemorrhage.
- Known AVM or aneurysm.
- Post myocardial infarction or pericarditis.
- Another stroke, intracranial surgery or serious head trauma within the preceding three months.
- Delay in patient arrival (> 4.5 hours from symptom onset).
Exclusion/Contraindications
Criteria for IV tPA

• Age less than 18 years old (treatment considered at the discretion of the stroke team neurologist).
• Seizure at onset.
• Major surgery within 14 days.
• History of intracranial hemorrhage.
• Active internal bleeding.
• Patients taking anticoagulants or who have received heparin within the 48 hours preceding the onset of stroke and have an elevated pTT.
• PT >15 seconds.
• Platelet Count <100,000 per cubic millimeter.
Exclusion/Contraindications
Criteria for IV tPA

- HTN: SBP >185mmHg or DBP >110mmHg on repeated measurements at time of treatment (not responsive to antihypertensive medications).
- Abnormal blood glucose level (<50mg / deciliter or >400mg / deciliter).
- History of GI or Urinary Tract hemorrhage within 21 days
- Arterial pressure puncture at non-compressible site within the previous 7 days.
- Recent Lumbar Puncture.

Inclusion/Exclusion Criteria based upon tPA Stroke Study Group Guidelines – www.stroke-site.org

Disclaimer: This acute Stroke Algorithm is meant to serve as a guide only. It is not reflective of all treatment options for all patients. Ultimate treatment decisions are at the discretion of the treating physician.
• IV tPA is only administered by the M.D. or R.N.

• In the ED, tPA is available in the accudose refrigerator.

• In the rest of the hospital, tPA is mixed in the pharmacy and brought to the bedside.
tPA Dosing and Administration

- tPA Dosing Formula
  - 0.9mg x (patient weight in kg) = ___ mg total tPA dose
  - *It is very important to remember that the max dose for any patient is 90 mg.*

- Administration
  - tPA is stored in the refrigerator. Reconstitute per directions. Do not shake vials, gently roll them to mix the powder with the sterile saline.
  - *Important Note: A 10mg waste should be removed prior to administration of bolus or infusion.*
  - 10% of the calculated dose is given as a bolus over 1 minute. The remaining 90% is to be administered over 60 minutes.
  - IV administration only!!
  - tPA must be ordered by an Attending Physician.
  - Double check for correct dose (MD, RN)
  - Document bolus dose and infusion amount with another RN, MD witness.
The Patient weight is 121 lbs. Calculate the bolus and infusion dose.
0.9 mg x 55 kg = 49.5 mg total tPA dose for this patient.

4.95 mg is the bolus dose

44.55 mg is the infusion dose
The Patient weight is 92 kg. Calculate the bolus and infusion dose.
• 0.9 mg x 92 kg = 82.8 mg total tPA dose for this patient.

• 8.28 mg is the bolus dose

• 74.52 mg is the infusion dose
The Patient weight is 242 lbs. Calculate the bolus and infusion dose.
0.9 mg x 110 kg = 99 mg total tPA dose for this patient.

IMPORTANT NOTE: 90 mg is the max dose for any patient!! Recalculate the dose based on this information.

- 9 mg is the bolus dose
- 81 mg is the infusion dose
• How much do you waste from each bottle of tPA...at least?

A minimum of 10 mg must be wasted for every patient!
What is the MAX dose for any given patient regardless of waste?

90 mg is the MAX dose for every patient!
tPA Calculations

• Over what time period do you administer a bolus?
  A bolus is administered over 1 minute

• An infusion?
  An infusion is administered over 60 minutes
During and After IV tPA Treatment

• Monitor B/P for the first 24 hours after starting treatment:
  * Every 15 minutes for 2 hours after starting the infusion
  * Every 30 minutes for 6 hours
  * Every hour for 16 hours

• Monitor Neurologic status every 30 min x4

• Watch for bleeding – puncture sites, urine, stool etc.

• Know signs/symptoms of Intracerebral Hemorrhage: Any acute neurological deterioration, new HA, N/V, sudden HTN

• Foley catheter must be placed with order in WIZ PRIOR to IV tPA infusion/bolus, otherwise avoid placement for 12-24 hours post IV tPA infusion.
During and After IV tPA Treatment

Who spends more time at the patient’s bedside??

YOU DO!!

- Know the complications and adverse reactions to IV tPA.
During and After IV tPA Treatment

Post tPA Infusion:

- Continue to monitor for signs/symptoms of intracerebral hemorrhage or other types of hemorrhage
- No unnecessary blood draws or invasive procedures for 12 hours after tPA
- No aspirin, heparin, warfarin, or other antithrombotic or antiplatelet drugs 24 hours after tPA
- Observe for other adverse reactions to tPA such as: cerebral edema, cerebral herniation, seizure, new ischemic stroke. These events may be life threatening and may lead to death.
During and After IV tPA Treatment

If Hemorrhage is suspected:

• **STOP TPA INFUSION**
  
  • Call MD immediately
  
  • Be prepared to transport the patient to CT for a STAT head CT without contrast
  
  • Be prepared to draw blood for PT, PTT, platelet count, fibrinogen, type and hold, other lab work as ordered
  
  • Be prepared to administer cryo and/or platelets as ordered
When the tPA is complete, hang a 50 mL bag of NS to flush the remainder of the tPA through the line to be sure the patient receives the entire drug amount prescribed.
During and After tPA IV Treatment

Documentation

• In the ED, remember to use the green Acute Code Stroke Documentation Checklist to assure accurate documentation of times and completion of required tasks

• Obtain/document vital signs/neuro checks as indicated on Acute Code Stroke worksheet

• Be sure to inform nurse in the Neurosciences ICU where you are with post-tPA vital signs frequency during your SBAR report at transfer

• **Important**: The Green Code Stroke Documentation Tool IS a permanent chart document. Complete it and place in Jacki Ashburn’s box located at the charge nurse desk.
Stroke Box

• The Stroke Box is located in T2.

• It is important to restock the box after every use replacing the items that were used. A list of the enclosed contents is located inside the box.

• After each use, return the box promptly to T2. A new lock must be placed on the box and logged into the log book.
Stroke Box Contents

- IV insertion tools (IV catheter and line setup equipment).
- Blood tubes, vacutainers and empty 10cc syringes for drawing blood while in CT-scan.
- Code Stroke Worksheets (more worksheets are located at the charge nurse desk if needed).
- IV tPA administration information.
- Stroke scale assessment tools.
- Educational pamphlets for patients and family members.
- IV phenylephrine and IV labatelol with dosing drip calculations.
- IV tubing and NS for mixing drips.
- Purple STROKE stickers.
- Calculator, pen lights and extra locks located in the lid.
Patient and Family Education

- Stroke Awareness Education for patients and family members includes:
  - Recognizing the signs and symptoms of stroke and to activate the 911 system.
  - Teaching patients and families about correcting those risk factors that can be modified and accepting those that cannot.
Modifiable Risk Factors For Stroke

- History of hypertension
- Smoke cigarettes
- History of diabetes
- History of heart and/or blood vessel disease
- Have a high RBC count
- High cholesterol
- History of sickle cell disease
- History of atrial fibrillation
Non-Modifiable Risk Factors for Stroke

- Age 55 or older
- History of heart and/or blood vessel disease
- Family history of stroke
- History of a stroke
What is a CODE STROKE?

Important Times to Remember:
- Door to CT Scan: 15 minutes
- Door to Decision (MD): 45 minutes
- Door to Treatment (tPA): 60 minutes
- Order for tPA to Administration (Nurse): 15 minutes
- Order to Lab Results: 45 minutes
ATYPICAL PRESENTATIONS
For More Information

• Visit The Vanderbilt Stroke Center Website for educational opportunities, events in the community and clinical research in the field of Neurosciences.

  • http://www.vanderbiltstrokecenter.com
  • OR
  • http://www.vanderbilthealth.com/clinicalneurosciences/
• http://www.jacho.org/dssc/psc/psc.htm
• www.stroke-site.org
• American Heart Association (2003). Know the signs of stroke – educational pamphlet
QUESTIONS?