RURAL EMERGENCY DEPARTMENT BEST PRACTICE FOR TREATMENT OF ACUTE ISCHEMIC STROKE

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DISCLOSURES

• NONE

• Mention of off label use of tPA in pediatric population
• Many patients with ischemic stroke are not treated with tPA:
  • Late presentation to the ED
  • Delays in assessment/administration of IV tPA
  • Lack of urgency in stroke treatment is poorly appreciated

• Earlier administration of IV tPA after the onset of stroke symptoms is directly associated with greater functional recovery
  • For every 1 minute of ischemic stroke, 1.9 million neurons die

• One of the potential approaches to increase treatment opportunities and improve stroke outcomes is to provide this treatment in a more timely fashion
  • Reduce door to needle time for administration of tPA
• **Severity of ischemic stroke depends on:**
  • degree of impairment of cerebral blood flow and the time to reperfusion.

• **Between the ischemic core and normally perfused brain is the penumbra**
  • zone of moderately reduced cerebral blood flow, dependent on the proximal arterial occlusion and collateral supply
  • Hypoxic neurons, inactive
  • **STILL Viable**
  • Target of stroke treatment
• IV tPA is recommended for selected patients who may be treated within 3 hours of onset of ischemic stroke (Class I Recommendation, Level of Evidence A).

• tPA should be administered to eligible patients who can be treated in the time period of 3 to 4.5 hours after stroke (Class I Recommendation, Level of Evidence B).
  • Despite this additional treatment window, opportunity for improvement is greatest with early treatment
  • Remember, 1.9 million neurons die per minute they are hypoxic—**TIME IS BRAIN.**
NUMBER OF PATIENTS WHO BENEFIT AND ARE HARMED PER 100 PATIENTS TREATED WITH TPA IN EACH TIME WINDOW

Lansberg et al, Stroke 2009
• Number of patients that you need to treat with IV tPA for near normal or normal recovery from ischemic CVA is 8.3
  • That means, for every 100 patients treated, 32 patients benefit.
  • 3 are harmed
  • What does this compare to?
  • NNT for aspirin in STEMI is 42—for one patient to survive because they received ASA. (Randomised trial of intravenous streptokinase, oral aspirin, both or neither among 17,187 cases of suspected acute myocardial infarction: ISIS-2. Lancet, 1998 Aug 13;2(8607):349-60 PMID: 2899772.)
  • So when we give aspirin so freely, because it’s a core measure, why are we not having the same attitude with tPA in tx of CVA?

• This article was data from 6 randomized placebo-controlled trials of tPA. Treatment was started within 6 hours of onset of stroke in 2775 patients—they received either tPA or placebo
  • Favorable outcome (at 3 mo) increased as time to tPA tx decreased—so the sooner it was given, the better
  • And the best outcomes were seen in the group of patients who received tPA within 90 mins of symptom onset
  • Confidence intervals fell below 1 in the 4.5-6 hr group
SO HOW DOES THIS TRANSLATE TO YOUR ED?
ED GOALS FOR
MANAGEMENT OF STROKE

• **Identify signs/symptoms of possible stroke**
  - If prehospital (EMS), establish time of onset
  - Alert the ED that you have a stroke patient
  - Check glucose

• **General Assessment/Stabilization: 0-10 mins**
  - ABCs, O2, IV, accucheck, neuro assessment, order emergent CT, EKG, activate a stroke team (who has one?)
  - Door to CT—an option if stroke called prehospital
  - Does your CT scanner need time to “warm up”?

• **ED Physician: 10-25 mins (can be simultaneous)**
  - Focused history and physical exam, laboratories, call for consult (neuro/telestroke, etc)
  - Who has neuro consult available? Who has telestroke?
  - NIHSS, time of onset
ED GOALS FOR MANAGEMENT OF STROKE

• CT Scan and Stroke Neurology Consult: 25-45 mins
  • Interpret CT Scan
    • Where are you radiologists? In house, at a related center, in Hawaii, or do you have Nighthawk?
    • How many of you get a result back in 0-45 mins from the patient arrival?

• No hemorrhage? Decide on treatment and initiate tPA infusion: 45-60 mins
  • Where is your tPA? Pyxis or in pharmacy? Do you know dosing? Pt weight? Bolus dose, followed by drip over one hour? Be sure to flush tubing.
BEST PRACTICE

- Door to CT: 25 mins
- CT results back to you: 45 mins
- tPA given: within 60 mins
Inclusion Criteria

- Diagnosis of ischemic stroke
- Onset of symptoms <3 hours before treatment OR 3-4.5 hours before treatment
- Age >18 years
  - Would you ever tPA someone younger than this? It is currently off label use.
3 HOUR EXCLUSION CRITERIA

- Head trauma/prior CVA in last 3 months
- Symptoms suggestive of SAH
- Arterial puncture at NONCOMPRESSIBLE site in previous 7 days
- Hx of prior ICH
- Intracranial neoplasm/aneurysm/AVM
- Systolic BP >185 or Diastolic BP >110 mg at time of treatment (may give labetalol, nicardipine, hydralazine prior to treatment to get BP in goal range)
- Active internal bleeding or acute trauma
- Recent intracranial or intraspinal surgery
- Taking an oral anticoagulant, OR if on one, INR <1.7 or PT <15
- Taking a direct thrombin inhibitor or factor Xa inhibitor within 48 hours OR with elevated PTT, INR, TT, or factor Xa assay
- Platelets <100,000
- Blood glucose <50
- CT shows multilobular infarction
3 HOUR RELATIVE CONTRAINDICATIONS

- GI or GU hemorrhage (not menstruation) in previous 21 days
- Major surgery/trauma in last 14 days
- MI in last 3 months
- Seizure at onset with residual postictal state
- Pregnancy
- Minor or rapidly improving neurologic symptoms
3 TO 4.5 HOUR WINDOW

- Eligibility is the same for those who are candidates for 3 hour window, with the following exclusions:
  - Patients older than 80
  - NIHSS >25
  - Those taking an oral anticoagulant REGARDLESS of INR
  - Hx of both CVA and DM
NIHSS

- [http://nihss-english.trainingcampus.net/uas/modules/trees/windex.aspx](http://nihss-english.trainingcampus.net/uas/modules/trees/windex.aspx)
  - Take on online course to better understand the scoring

- **Found in the tPA booklet**

- **Also, a nice app for smartphone users is “Neuro Toolkit”**
  - Includes the pictures for aphasia

- **Link to pdf:**

- **Score should not be an indicator of whether or not patient receives tPA (unless >25 in 3-4.5 hr window)**
  - An educated discussion should be made with patient and family regarding their wishes to receive treatment; a score of 4 may be devastating for the patient…
Consent to Administer Alteplase (tPA)

Physician Name: ___________________________________________________________

has informed me of the risks and benefits for utilizing Alteplase, a tissue plasminogen activator (tPA) to treat the acute ischemic stroke I am now experiencing.

I understand that the Potential Benefits of Alteplase include the following:

• Likelihood of improvement of stroke symptoms such as, extremity weakness, impaired speech and/or visual problems up to three months after onset of symptoms.

I understand that the Potential Major Risks of Alteplase include the following:

• Likelihood of significant bleeding in the brain within 36 hours of treatment

A list of contraindications has been reviewed with me. I understand and agree that I have no contraindications.

I understand that I will be transferred to the critical care area after receiving the treatment and will remain there for a minimum of 24 hours.

I CONSENT to the administration of Alteplase for my symptoms.

I REFUSE the administration of Alteplase for my symptoms.

By signing this form, I am indicating I understand the contents of this document, agree to its provisions and consent or refuse as noted above to the administration of Alteplase.

I know if I have concerns or would like more detailed information, I can ask more questions and get more information from my attending physician.

I am also acknowledging I know that the administration of Alteplase is not an exact science and that guarantees about the outcome of this treatment have been made.

____________________________________________________
Printed Name of Patient

________/____/____ at ___:___ am
Date Time

Signature of Patient or Person Authorized to Consent for Patient

________/____/____ at ___:___ am
Date Time

Printed Name of Person Authorized to Consent for Patient

______________________________
Witness Signature

________/____/____ at ___:___ am
Date Time

Printed Name of Witness

I certify that I have discussed the benefits, risks, and alternatives with this patient.

________/____/____ at ___:___ am
Date Time

Signature of Physician

____________________________________________________
Printed Name of Physician
FACT SHEET TO FACILITATE DECISION

- Helps with informed consent
- Have printed this and given to patients and their families to help with decision making on if they are agreeable to treatment

BEST PRACTICE

• **EMS Activation/Notification**
  - Have EMS trained in identification of acute CVA
  - Early notification can reduce time to CT

• **Activate your Stroke Team**
  - Don’t have one? Make one—including lab, CT technicians, radiologist reading the CT, pharmacy, neurology (if you have them), etc.
  - One call—either as a page or central operator

• **Stroke Toolkit**
  - Have standardized order sets/protocols, NIHSS available, hospital specific algorithms or other tools readily available
    - tPA consent form, contraindication checklists
BEST PRACTICE

• Imaging in 25 mins from arrival, report back in 45 mins
  • Get your radiology team on board—one call to all

• Rapid laboratory results
  • Should be drawn in first 10 mins of arrival.
  • If lab comes to your ED to draw, they need to be part of one call to all
  • Need to have platelets and coags back w/in 45 mins from arrival
  • If this is not feasible, consider investing in point of care testing
• Mix tPA ahead of time
  • Get it out when your patient is going to the scanner
  • Go to the scanner and discuss contraindications w/pt, as well as risks/benefits, etc.
  • This way, you can treat at the earliest possible time from onset
  • Discuss this financially with your institution (mixing before deciding to give)—you may be able to be reimbursed by vendor for not using it
  • TIME IS BRAIN.
What if time of onset is >4.5 hrs or unknown

- If your acute CVA patient is not a candidate for IV tPA therapy, there are other options, and this warrants transfer to an institution with neurology/IR capability for endovascular treatment options
- Even if your patient qualifies, approx. 20% of pts with large vessel occlusions reperfuse—may still require endovascular intervention
- PROACT trial—intra-arterial thrombolysis beneficial up to 6 hours s/p onset
- MERCI, Multi-MERCI and Penumbra trials—mechanical thrombectomy has been successful 8 hours after onset
VIDEO

- Door to Needle Goals
IN CLOSING

• Get everyone to work as a team
  • EMS, RNs, registration, radiology (techs and physicians), laboratory, pharmacy
  • If your ED physician is in another room, kindly interrupt that potentially non-emergent visit
  • Make “one call to all”—Code stroke—whatever you want to call it

• Find a way to follow your progress (director of quality)
  • Where are your barriers? Are you meeting your goals sometimes vs. not at other times?

• Don’t be afraid to give tPA
  • You give lytics a lot more often for STEMI
  • It is the only FDA approved treatment for stroke

• Praise your team for a job well done if and when you meet a door to needle time of < 60 minutes

• Save brains!