

EM Basic- Stroke and Transient Ischemic Attack (TIA)

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Stroke- caused by an acute clot in a cerebral artery (ischemic stroke) or bleeding from cerebral artery (hemorrhagic stroke)

- Ischemic stroke causes- embolized clot (a-fib), septic embolic from a heart valve, embolized DVT with patent foramen ovale
- Hemorrhagic stroke causes- ruptured aneurysm or bleeding from arteries stressed by years of hypertension

Stroke definition- an acute onset of a neurological deficit

TIA definition- an acute neuro deficit that rapidly improves

- Old definition of stroke- symptoms had to last 24 hours
- Time period is irrelevant in age of thrombolytics since we only have 3 hours (or 4.5 hours in some patients) to give them
- Most TIA symptoms resolve in 30-60 minutes

Prehospital concerns

- Get a good history- when exactly did the symptoms start? When was the last time the patient was seen normal?

PEARL- Thrombolytic window- 3 hours from onset of sx's (4.5 in some patients) Patients who "wake up" with symptoms generally aren't eligible for thrombolytics

- Is this an old neuro deficit or a new deficit?
- Bring family members/bystanders to the ER to help with history, if possible
- Be aggressive with airway management

PEARL- GET A D-stick- hypoglycemia can mimic stroke (theory- area of brain damaged by a previous stroke is more susceptible to hypoglycemia and causes neuro deficits with low blood sugar)

Emergency Department priorities (if not done enroute by EMS)

- 1) Get a good history
- 2) Do a rapid neuro exam
- 3) Get a D-stick
- 4) IV access

5) Non-contrast head CT

Activate stroke protocol (if applicable)- should alert labs and radiology to expedite labs and page the on-call call neurologist

History- find out exactly when the symptoms started, Slurred speech? Confusion? Motor weakness? Any headache or trauma? Any falls?

Medical History- Hx of HTN, DM, previous stroke? Surgical history (especially in any surgery in past 14 days, spinal or brain surgery in past 3 months), taking any anticoagulants (warfarin, dabigatran, clopidigrel)?

Rapid neuro exam prior to CT- use Cincinnati Stroke Scale as a basis

- FAST- Facial droop, arm drift, slurred speech, time from onset
- Add on to this- extremity strength in all extremities

D-stick- if low, treat and observe for effect, if over 400 may be contraindication to thrombolytics

IV access/EKG- DO NOT let IV access delay transport to CT scanner, if patient is a tough stick then take an IO device to the CT scanner just in case- **Labs-** CBC, Chem 10, Coags, other testing as clinically indicated

PEARL- the only thing that should delay your transport to the CT scanner is to take the patient's airway- watch their mental status! Should probably accompany these patients to the scanner with airway equipment

In CT scanner- do your own wet read looking for blood (bright white) and talk immediately to the radiologist. If you see blood on the CT, stay in the CT scanner and get a CT angiogram of the brain with contrast (helps determine where the patient is bleeding from). Defer until creatinine comes back if pt has a history of kidney disease. Acknowledge that you probably don't have a creatinine back in your chart. Patients with intracranial bleeding aren't candidates for thrombolytics

Back in ED- repeat your neuro exam and do a complete NIH stroke scale (use an app or look on google)- helps us speak the same language as the neurologists- stroke scale too low or too high may be contraindication to thrombolytics

PEARL- important to repeat a neuro exam because if symptoms are improving this could be a TIA

A word on thrombolytics- lots of controversy in EM regarding their safety and efficacy. Test answer = give them

Patient with acute ischemic stroke, in the treatment window, persistent neuro deficit, normal blood sugar, and normal non-contrast head CT- Thrombolytic contraindications

4 categories- increased bleeding risk, severe hypertension, history that suggests seizure/SAH, miscellaneous

Increased bleeding risk:

- Surgery or trauma in past 14 days
- Intracranial or spinal surgery in past 3 months
- Any history of intracranial bleeding
- History of brain tumor or aneurysm
- Active internal bleeding
- Recent puncture at a non-compressible site
- Platelets less than 100,000
- INR above 1.7 (controversial- some say warfarin use is an absolute contraindication no matter what the INR is)

Severe hypertension- BP above 185/110 despite aggressive treatment

- Use a titratable IV med like nicardipine, labetalol, or esmolol to lower patient's BP to above but no more than 20% in first hour

History suggesting seizure or subarachnoid hemorrhage

- Patients can have neuro deficits after a seizure (Todd's paralysis)
 - Any history of seizure? Intra-oral trauma? Incontinence?
- A sudden onset of headache could be a SAH- three questions:
 - Was it sudden in onset?
 - Is this the worst headache of your life?
 - Was the headache maximal at its onset?
 - If one is positive, strongly consider SAH
 - Remember that head CT may be negative in the first few hours after a SAH and SAH is an absolute contraindication to TPA

Miscellaneous contraindications

- Pregnancy or lactating
- Blood sugar over 400

Extended window criteria (4.5 hours from symptom onset vs. 3)

Contraindications for extended window (generally accepted)

- Age over 80
- A history of a previous stroke and diabetes
- More than 1/3 of MCA involved on head CT
- Any history of anticoagulation regardless of INR

Use of thrombolytics- TPA most common

-Get two IV lines if possible (one for TPA, one for other meds)

-Dosing

- 0.9 mg/kg (max dose 90mg- maxes out at 100kg)
- 10% given as a bolus
- 90% given over the next hour
- Double and triple check this dose with the entire team

-Routine foley?

- Most medical literature says to avoid Foleys with TPA
- Most stroke protocols have it on there
- Theory- in case patient gets hemorrhagic cystitis?
- If the patient can't void on their own put foley in prior to TPA
- Otherwise not sure about this given risk of catheter related UTI

-Admit to ICU

No bleed but not eligible for TPA- consult neurology, interventional radiology if available (may be able to do a clot retrieval, intra-arterial TPA)

Hemorrhagic stroke- Consult neurosurgery for possible interventions, reverse any anticoagulation, control hypertension below 180/110 but not more than 20% in first hour, transfer if needed for neurosurgical care

TIA- Symptoms resolve and do not come back, negative head CT- give aspirin 325 mg PO if not allergic and admit for further workup

Bell's palsy- stroke mimic, unilateral facial droop and can't close eye w/o any other neuro symptoms, may have viral symptoms, MUST involve the forehead or could represent a central stroke (forehead sparing = BAD), CT not required for dx- usually caused by viruses, steroids effective, antivirals with less evidence, prednisone 60mg PO daily for 6 days, taper by 10mg per day over next 4 days. Antivirals- acyclovir- 400mg PO five times a day for 10 days- valacyclovir (Valtrex)- 500 mg PO BID for 5 days, tape eye shut at night, lubricating eye drops during the day and lacrilube at night

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