**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

-Hemorraghic 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 sxs (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, dabigitran, 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 creatnine 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, miscellanrous

**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, labatelol, 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 headace 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 aspiring 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- valcyclovir (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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