Approach to Neuro-Emergencies

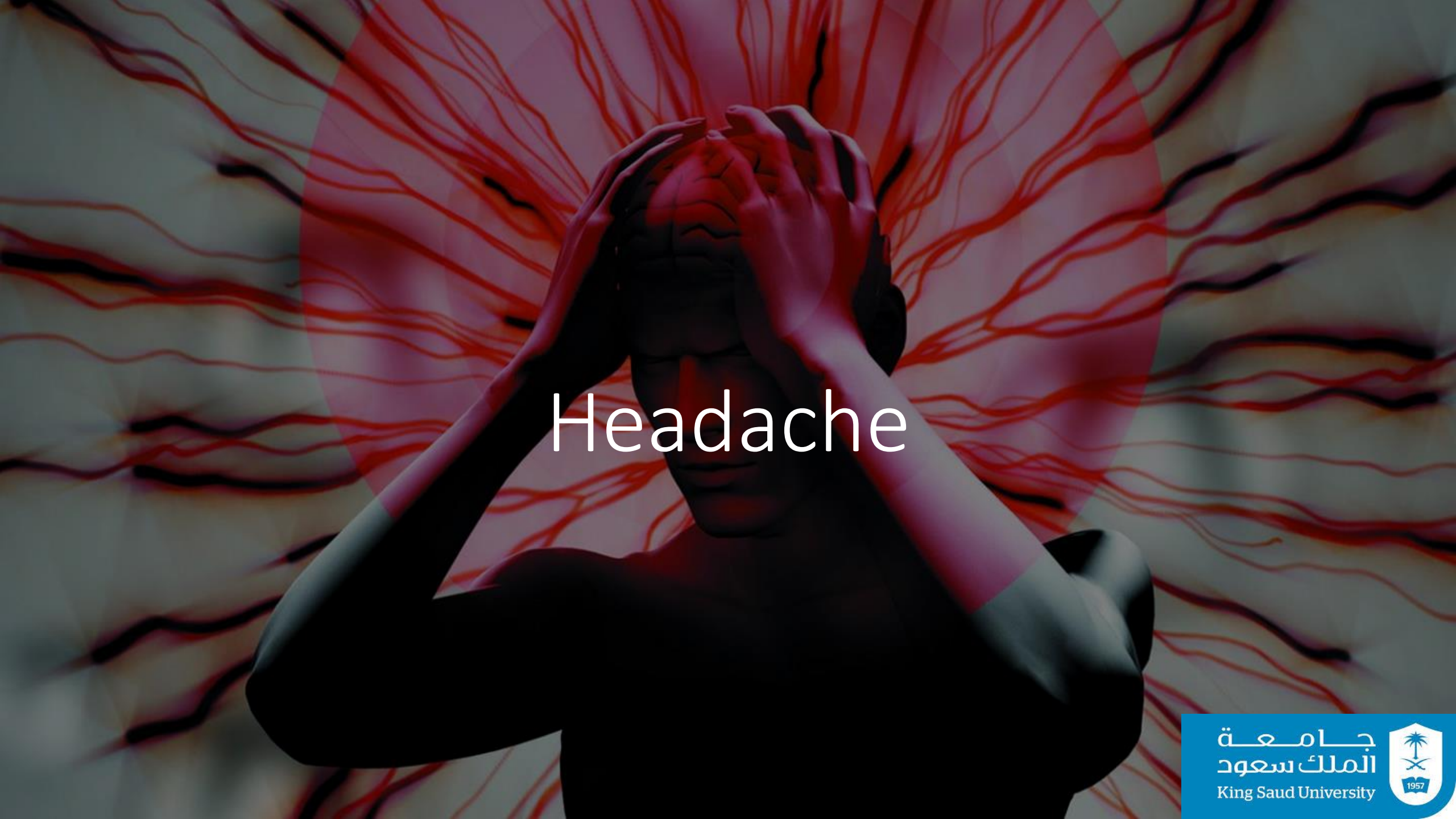
Fahad Abuguyan

MBBS MBA dABEM FRCPC

جامعة الملك سعود
King Saud University
1957

Objectives

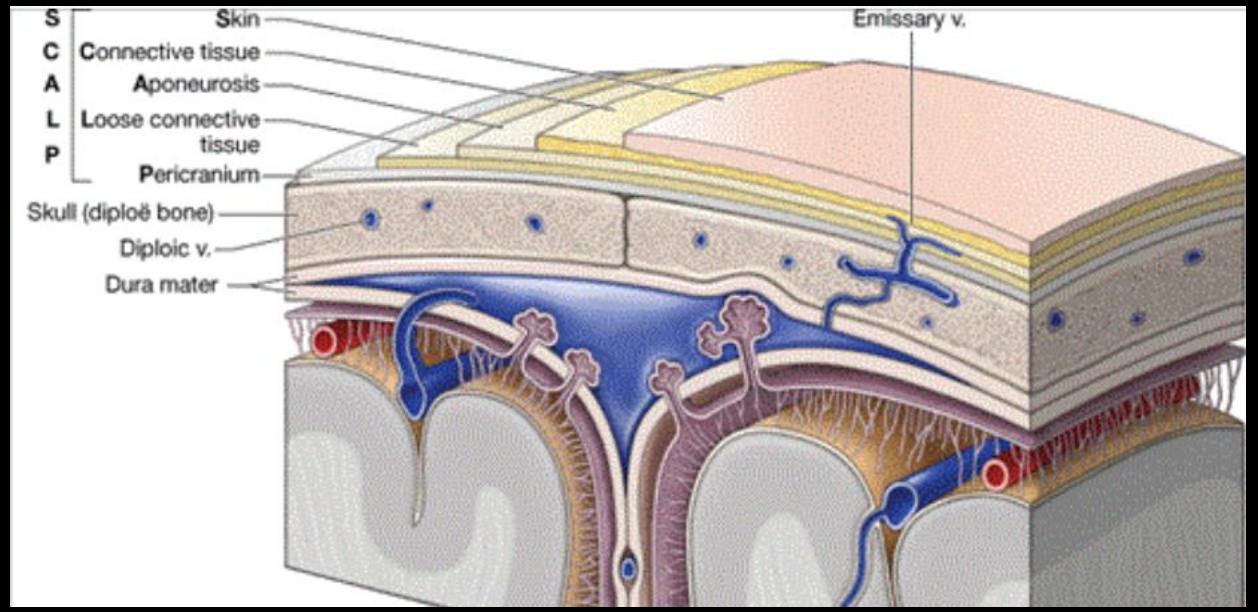
- ED approach to headache
- ED approach to seizures
- ED approach to CVA



Headache

Pathophysiology

- Brain parnychyma is NOT sensitive to pain.
- What is?
  - Meninges.
  - Vessels.
  - Various tissues lining the skull.
- Pain in head and neck may overlap.



Headache in the ED

- 3-5% of all ED visits
  - 50% - Tension headache.
  - 30% - Unidentified origin.
  - 10% - Migraine-type.
  - 8% - Potential serious causes.
  - 1% - Life-threatening disease.

Hx

- Onset & Pattern.
- Activity at time of onset.
- Trauma?
- Intensity.
- Character.
- Location.
- Exacerbating or relieving factors.
- Associated symptoms.
- Prior history?

Physical Examination

- General appearance
- Vitals
- HEENT
- Fundi
- Neurological

Symptom	Finding	Possible Diagnosis
Suddent onset	Lightning strike, thunderclap, with ALOC, FND or intractable pain	SAH
”Worst headache of my life”	Sudden onset	SAH
Near syncope or syncope	Suddent onset	SAH
Increase with movement	Clicking or snapping, tenderness over jaw	TMJ disease
Facial pain	Pain of forehead or maxillary sinus, nasal congestion	Sinusitis, Dental infection
Temportal or forehead pain	Temporal tenderness	Temporal arteritis (GCA)
Periorbital or retroorbital pain	Sudden onset with tearing	Temportal arteritis or Acute angle-closure glaucoma

Organ system	Critical Diagnosis	Emergent Diagnosis	Non-Emergent Diagnosis
Neuro, CNS, Vessels	SAH	Shunt failure Traction headaches SDH/EDH Tumor	Migraine Vascular headaches Trigeminal neuralgia Post LP Post-traumatic
Toxic or Metabolic	CO poisoning		
Environmental		Mountain sickness	
Collagen Vascular Disease	Temporal Arteritis		
Eye / ENT		Glaucoma Sinusitis	Dental, TMJ
MSK			Tension headache Cervical strain

DDX

Organ system	Critical Diagnosis	Emergent Diagnosis	Non-Emergent Diagnosis
Allergy			Cluster or histamine headache
Infectious Disease	Bacterial Meningitis Encephalitis	Brain abscess	Non-neurologic source of infection
Pulmonary or O_2		Anoxic headache Anemia	
Cardiovascular		Hypertensive crisis	Hypertension
Unspecified			Effort-dependent Coital

Ivestigations

- CBC
- ESR
- ECG
- CT head
- LP & CSF analysis

Investigations

Test	Findings	Diagnosis
CBC	Severe anemia	anoxia
ESR	Significant elevation	Temportal arteritis
ECG	Non-specific ST/T changes	SAH, increase CSF pressure
CT head	Increased ventricle size Blood in subarachnoid space Blood in epidural or subdural space Blood in brain parynchyma Areas of poor vascular flow Mass	Increased CSF pressure SAH EDH, SDH IPH Ischemic Stroke Tumor/abscess
LP	Increased pressure Increased protein Increased RBCs Increased WBC, decreased glucose, Gram stain +	Pseudotumor cerebrii Mass Shunt failure Tumor/lesion SAH Infection

Management

- Treat the underlying cause.

Migraine

- Chronic, recurrent
- Genetic predisposition, F>M
- With or without aura
- Unilateral (Bilateral in 40%), pulsating
- Moderate to severe
- Excacerbated by routine activities

Migraine

- Associated with N, V, photo/phono/osmo-phobia, blurred vision, lightheadedness, nasal congestion
- Gradual onset, lasting 4-72 hours
- Aura: FND that precede and are during the attacks, last 10 to 20-60 minutes, FULLY reversible

Migraine

- Sleep deprivation
- Stress
- Hunger
- Hormonal changes
- OCPs
- NTG

Migraine

- Ophthalmoplegic
- Hemiplegic
- Basilar-type
- Status Migrainosus (more than 72h)

Migraine

- DDx
- Diagnosis
- Mx

Tension

- Most common type of headaches (50%)
- Not a frequent cause of ED visits
- Tight, band-like discomfort, dull, non-pulsating
- Usually mild
- Simple analgesics

SAH

- Blood in subarachnoid space
- Ruptured saccular aneurysm*
- Occipital pain +/- meningismus
- <1% of all headaches presenting to ED
- 10% of all strokes
- Most common cause of death from stroke

SAH

- Sudden onset headache
- “Thunderclap” headache
- “Worst headache of my life”
- Exertion, valsalva, sexual intercourse → 20%
- Peak in seconds to minutes

SAH

- Nausea, vomiting → 75%
- Meningismus → 50%
- Neck stiffness → 25%
- FND → 20%
- Seizures → 17%

SAH

-

GRADE	CONDITION
0	Unruptured aneurysm
1	Asymptomatic or minimal headache and slight nuchal rigidity
2	Moderate or severe headache, nuchal rigidity, no neurologic deficit other than cranial nerve palsy
3	Drowsiness, confusion, or mild focal deficit
4	Stupor, moderate to severe hemiparesis
5	Deep coma, decerebrate posturing, moribund appearance

SAH

- CT
- LP with CSF analysis*
- Mx

Neoplasm

- Most common presenting complaint = headache
- Weeks to months → worsening
- Sleep disturbance, severe pain, N/V
- Primary benign or malignant
- Secondary (mets) → Lung, Breast, melanoma, GI carcinomas
- Neurosurgery

GCA

- Systemic inflammatory process of small and medium vessels
- Extra-cranial branches of aortic arch and ophthalmic vessels most common
- Rare <50 years
- F>M

GCA

- Headache, weeks to month
- Worsening
- Sharp, throbbing, aching
- Temporal region
- Worse at night and with cold
- +/- jaw claudication, fever, anorexia, weight loss
- PERMANENT VISUAL LOSS
- ESR, CRP, biopsy
- Steroids

Carotid & Vertebral Artery Dissection

- Most common cause of stroke in <45 years
- Spontaneous but often a risk factor*
- Sudden onset face or neck pain
- CT/CTA/MRI
- Antiplatelet therapy

CVST

- Headache
- Seizures
- Decreased LOC
- FND
- Ocular findings*

CVST

- Hypercoagulable states*
- CTA/MRI/MRV
- Anticoagulation

PTHA

- Common after simple trauma
- +/- other symptoms
- Simple analgesia

Glaucoma

- Sudden onset
- Localized to eye
- May radiate to teeth, ear, sinuses, forehead
- Visual symptoms
- Nausea / vomiting

Post-LP Headache

- Most common complication of LP

Intracranial Infection

- Meningitis, abscess, encephalitis
- Headache + associated symptoms

Hypertensive Headache

Conclusion

Careful history and physical examination can lead to the correct cause of the patient's headache.

Seizures

Definition

- Episodes of abnormal neurologic functioning caused by pathologically excessive activation of neurons
- Cerebral cortex or in the deep limbic system

Epidemiology

- 1% of all ED visits
- 2% of peds ED visits
- 3% of all EMS transports
- Febrile seizures –> Most common in peds
- 7% → status epilepticus

Status Epilepticus

Etiology	% of cases
AED non-compliance	25-26
Alcohol-related	15-24
Drug toxicity	2-10
Infection	8
Tumor	5-6
Trauma	3-5
Cerebrovascular disease	4-23
Metabolic	4-13
Hypoxia or cardiac arrest	4-12
Idipathic	4-5

Classification

- Cause
- Effect on mentation
- Motor activity

Approach

- Hx: Was this truly a seizure?
- Physical examination*
- Management
- Diagnostic testing

CT Indications

- First seizure
- Hx of trauma
- Hx of malignancy
- Immunocompromised
- Fever
- Persistent headache
- Anticoagulation
- New FND
- >40 without hx of epilepsy
- Prolonged post-ictal state

Seizure Management

- Airway control
- Benzodiazepines
- Phenytoin
- Phenobarbital
- Propofol
- Isoflurane

Dispo

- Admission to ICU if status
- EEG
- Treat underlying cause
- Driving??

CVA

Definition

- Any vascular injury that leads to a reduction in cerebral blood flow to a specific region of the brain, leading to neurological impairment.

Epidemiology

- 3rd leading cause of death in the US.
- Leading cause of impairment.
- 87% → Ischemic → thrombus vs embolus
- 13% hemorrhagic → ICH vs SAH

Ischemic

- Anterior vs Potserior circulation
- Presentation depends on the area involved

Hemorrhagic

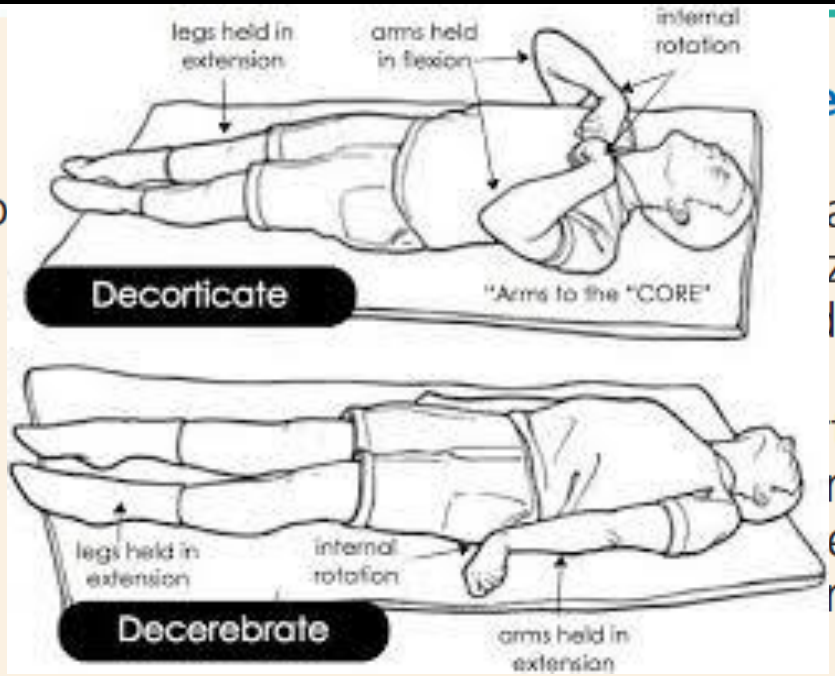
Traumatic

	Epidural	Subdural
Timing	Lucid Interval	Immediate/Progressive
Shape	Biconvex	Crescent
Vessel	Middle meningeal artery	Bridging veins
Sutures	Crosses	Does not cross

GCS

Eye Opening (E)

4 = Spontaneo
3 = To voice
2 = To pain
1 = None



esponse

al
zes to pain
lraws to

ticate
re
ebrate
re

DDx

Dx/Mx Ischemic

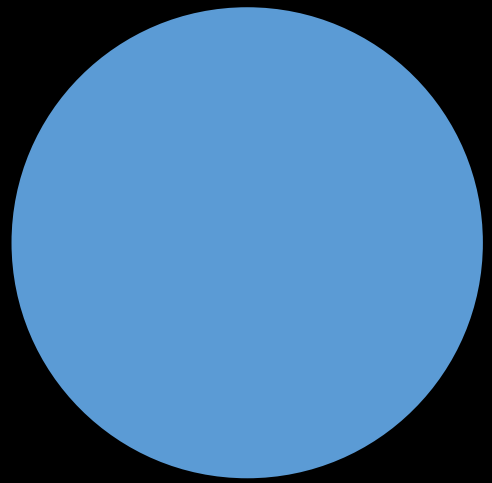
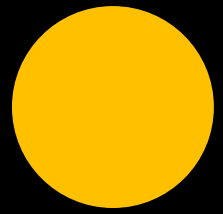
MANAGEMENT COMPONENT	TARGET TIME FRAME
Door to doctor	10 min
Door to CT completion	25 min
Door to CT scan reading	45 min
Door to treatment	60 min
Access to neurologic expertise*	15 min
Access to neurosurgical expertise*	2 hr

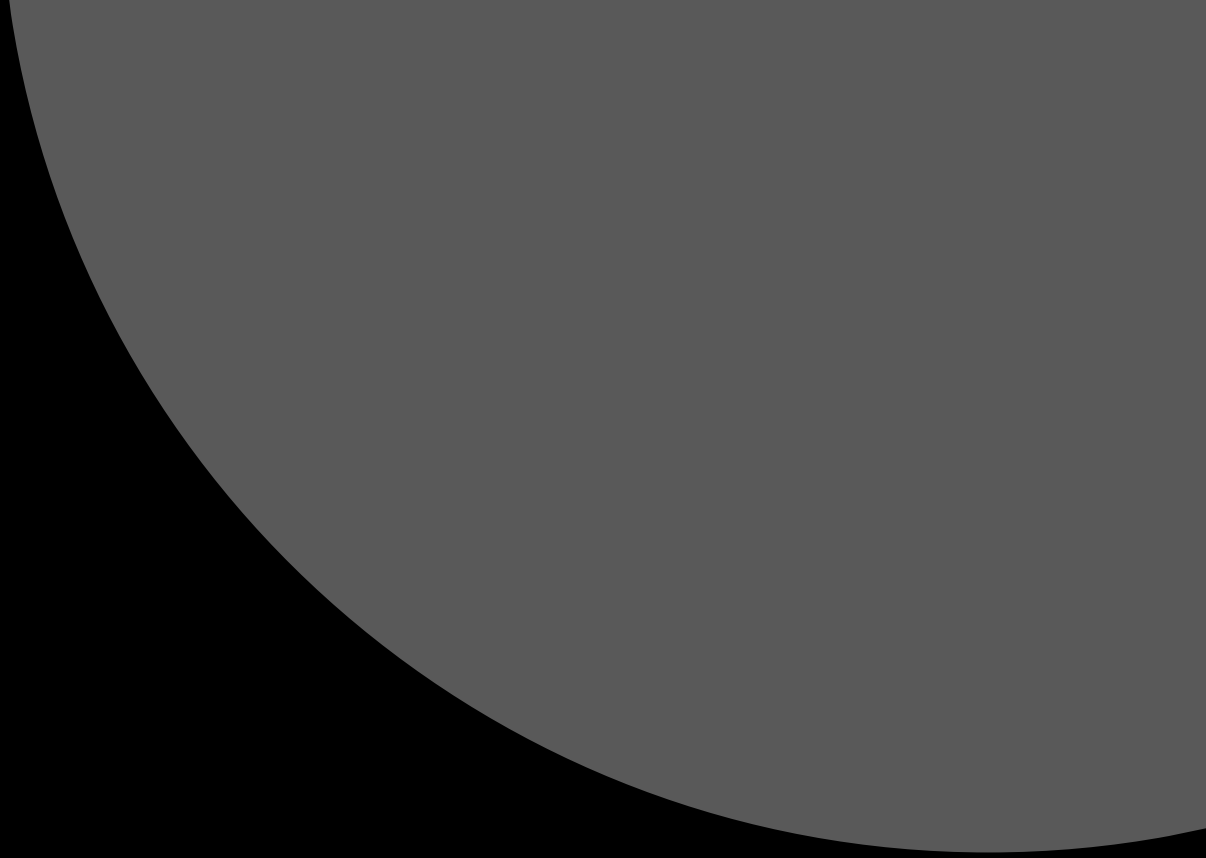
Dx/Mx Hemorrhagic

- Examination
- Airway Control
- BP management as needed
- CT → CTA / MRI

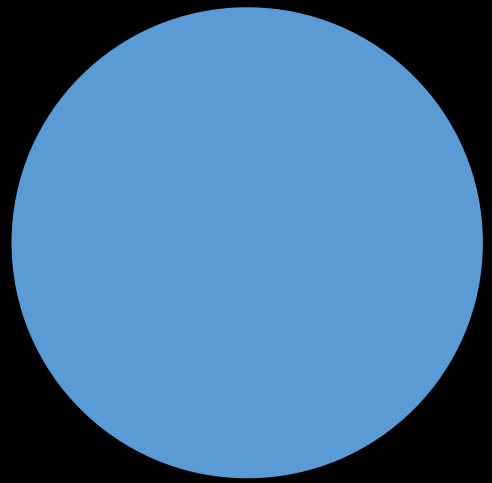
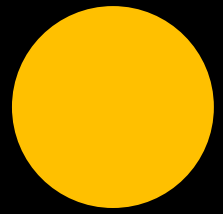
Conclusion

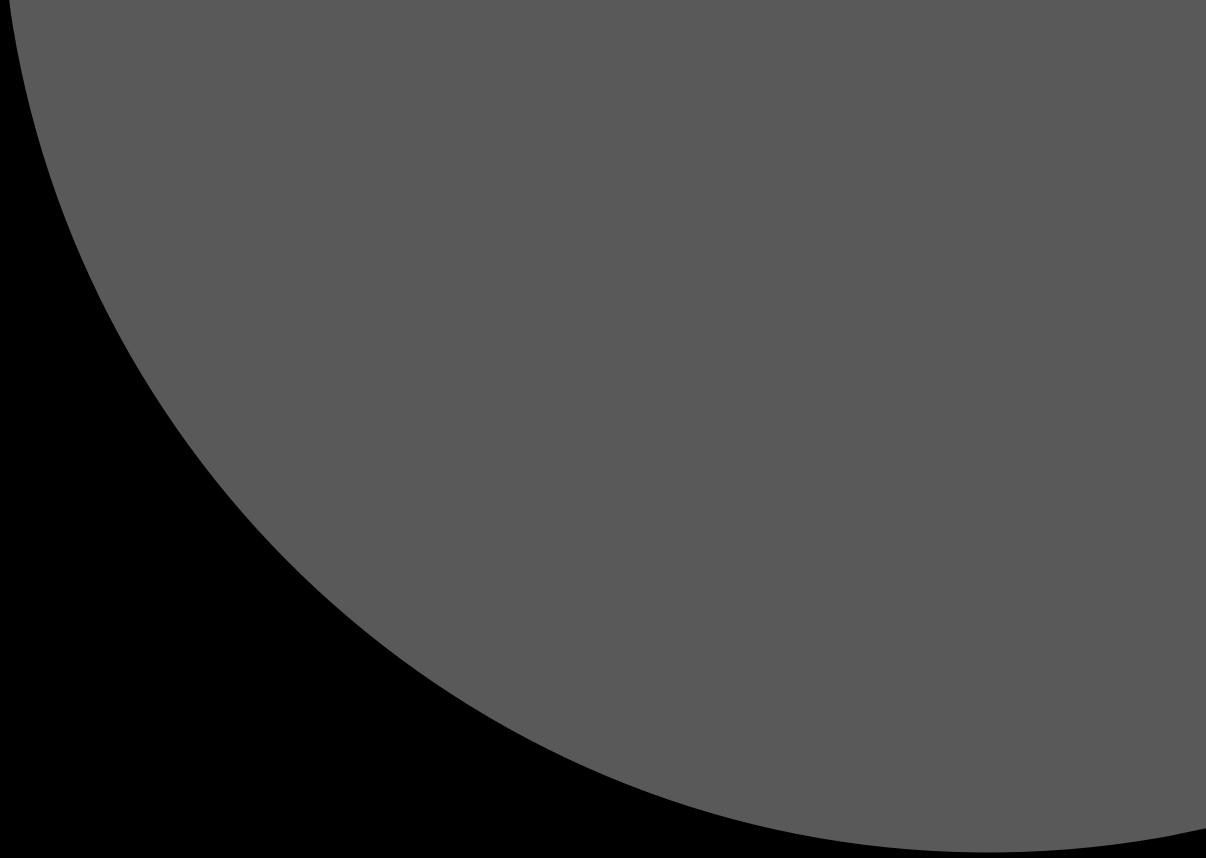
- Patients with signs and symptoms of an acute ischemic stroke within 4.5 hours of the last time they were known to be at their neurologic baseline should be evaluated for thrombolytic therapy with the appropriate inclusion and exclusion criteria.
- Carotid Doppler, MRA, or CTA studies are recommended before discharge of a patient with TIA from the ED.
- Overly aggressive blood pressure management should be avoided in patients with acute ischemic stroke.
- Accurate identification of the last time a patient was known to be at his or her neurologic baseline should be documented in all patients with stroke.
- Assessment of gait is essential to rule out posterior circulation stroke in patients with vertigo.
- The possibility of carotid or vertebral dissection should be considered in young patients with stroke and in patients with headaches and neck pain with acute stroke.



?



Thank you