Neurology emergencies; Stroke

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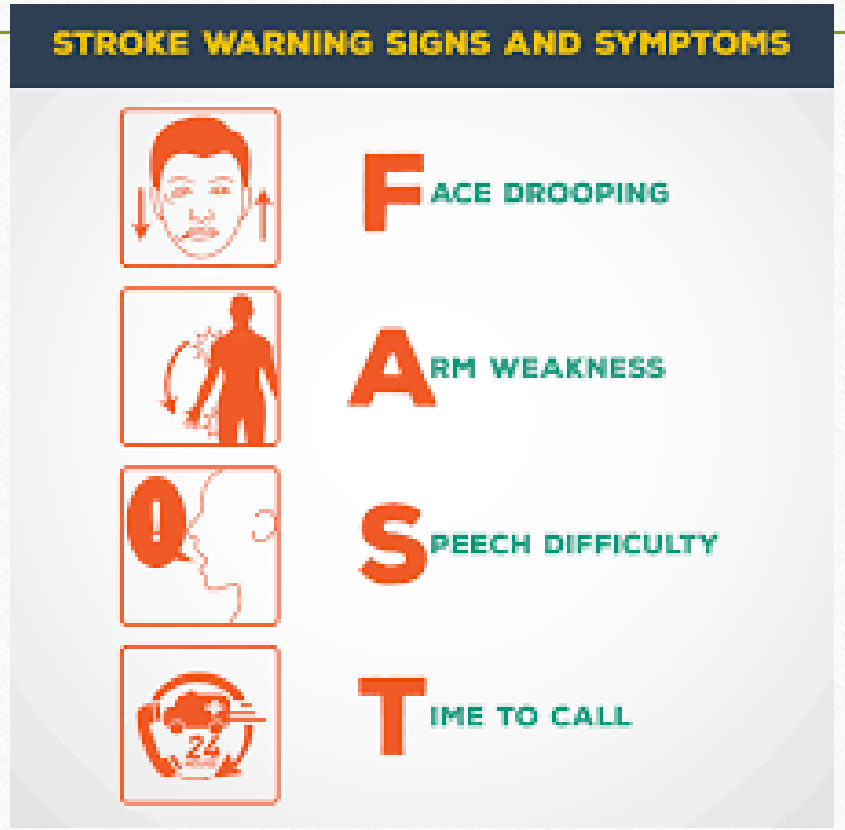
Objectives

- Knowing stroke
- Knowing diagnostic approach
- Detecting candidates for fibrinolytic therapy
- Emergency management and secondary prophylaxis

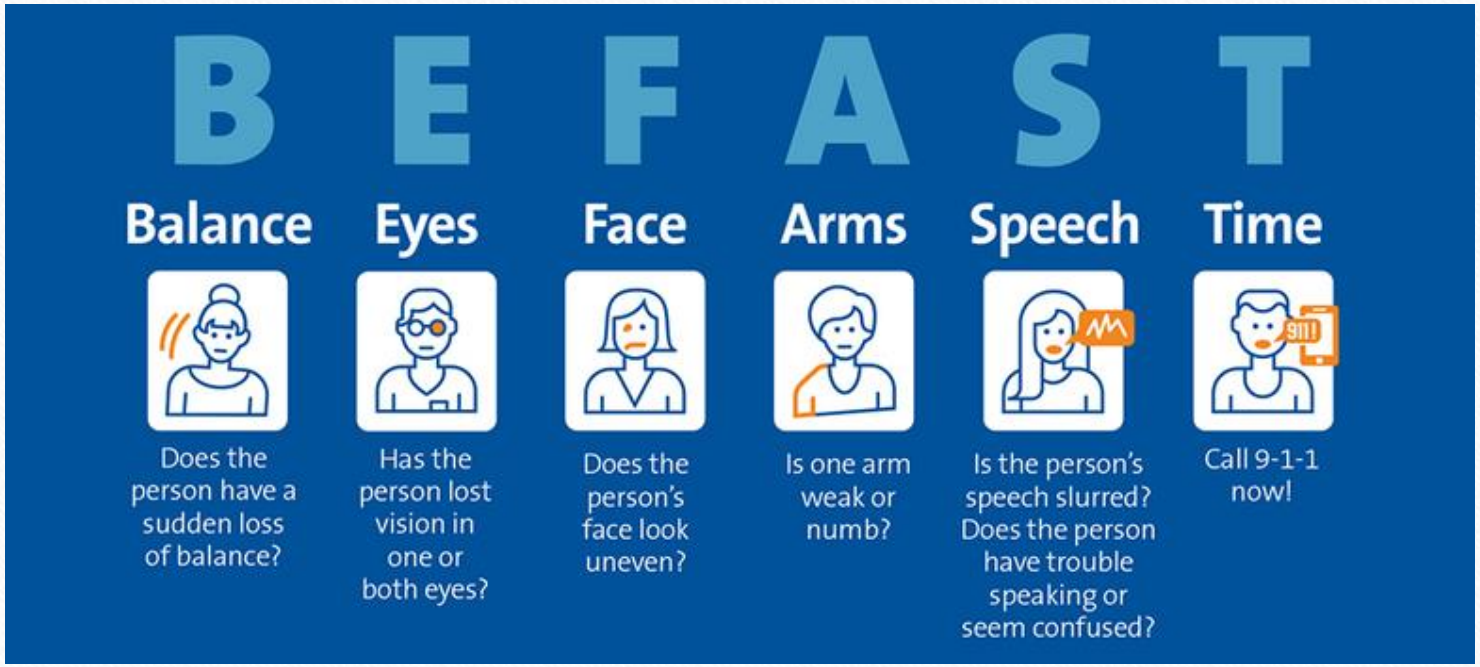
Stroke definition

- Stroke is a neurological impairment caused by disruption in blood supply to a region of the brain

Stroke presentation

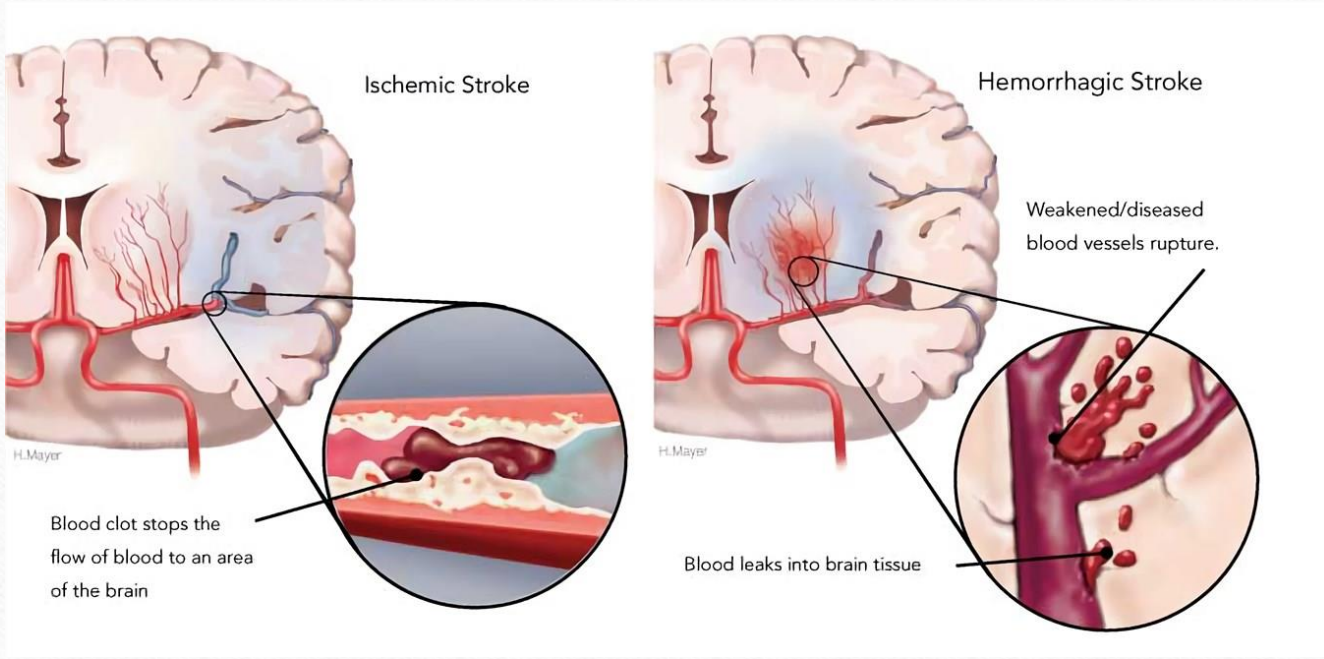


Stroke presentation



Stroke categorization

- Ischemic stroke
  - Thrombotic
  - Embolic
- Hemorrhagic stroke
  - ICH
  - SAH
  - SDH/EDH

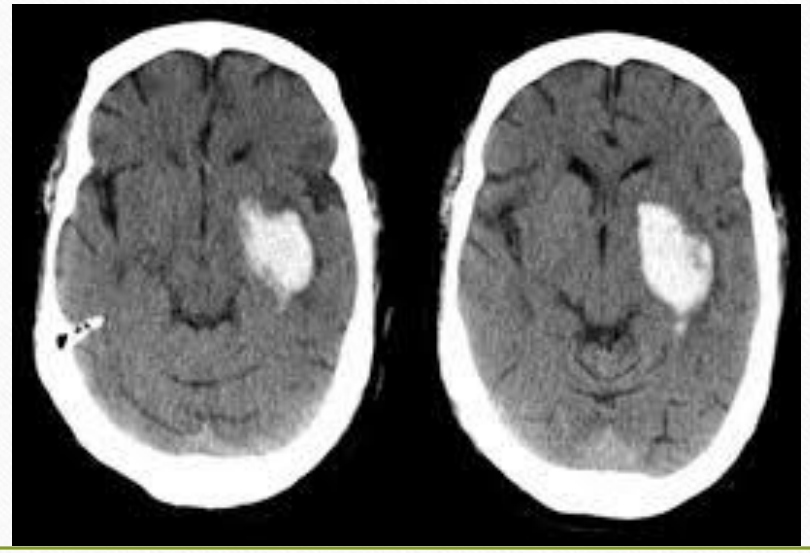


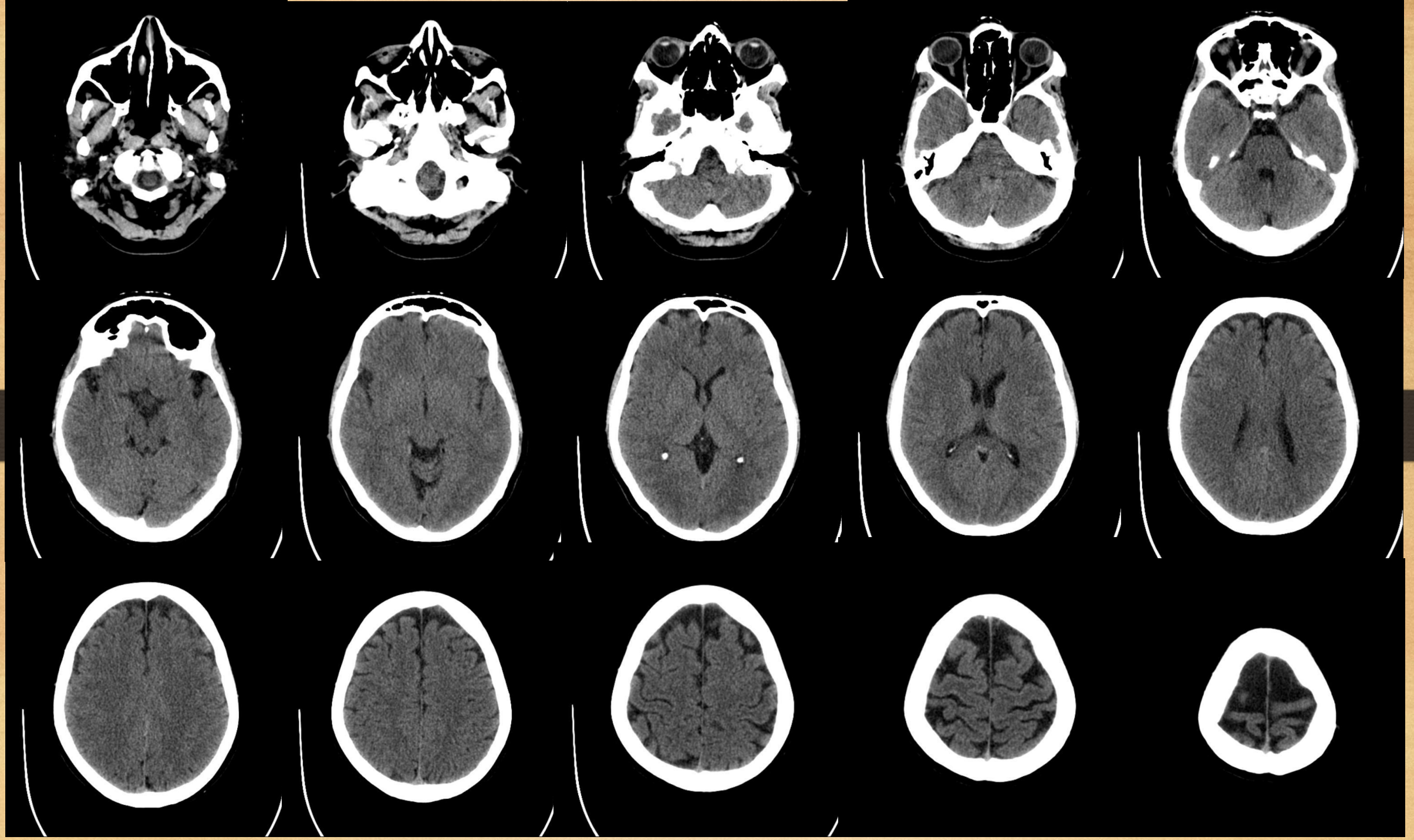
Intracerebral hemorrhage (ICH)

- Presentation
  - Focal neurological deficit, Headache, N&V, Altered mental status, seizure…
- Etiology
  - Microvascular disease (HTN, DM, Smoking)
  - Other vascular disorders (aneurysm, AVM, cavernoma, amyloid angiopathy…)
  - Coagulopathy

Intracerebral hemorrhage (cont.)

- Diagnosis
  - **CT scan**, MRI is also helpful



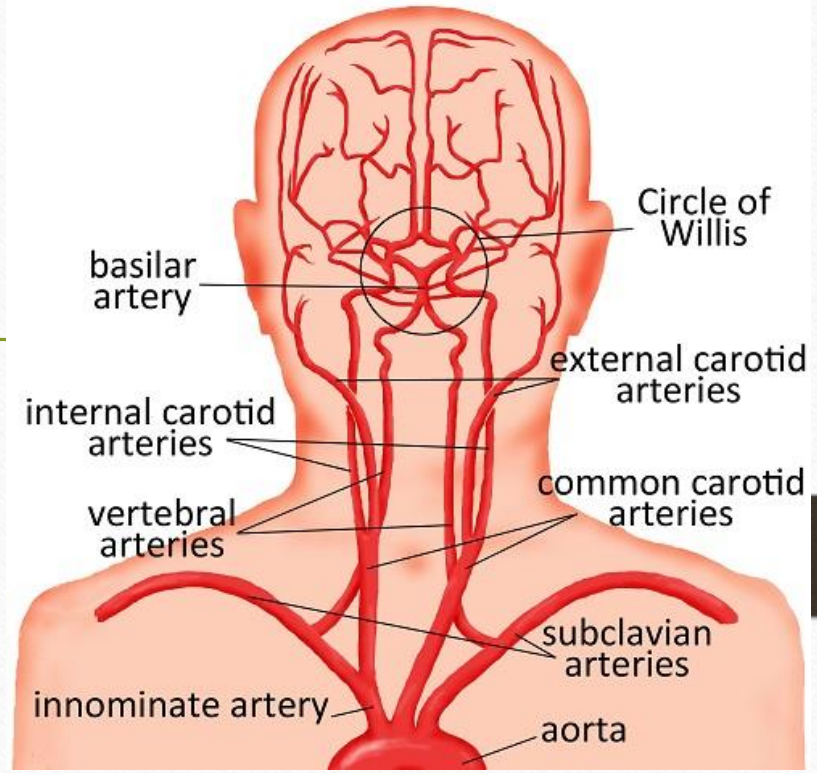


Intracerebral hemorrhage (cont.)

- Management
  - If altered mental status → consider surgical management
  - **Blood pressure control → lower than 140/90**
  - If seizure occurs → antiepileptic drugs

Ischemic stroke

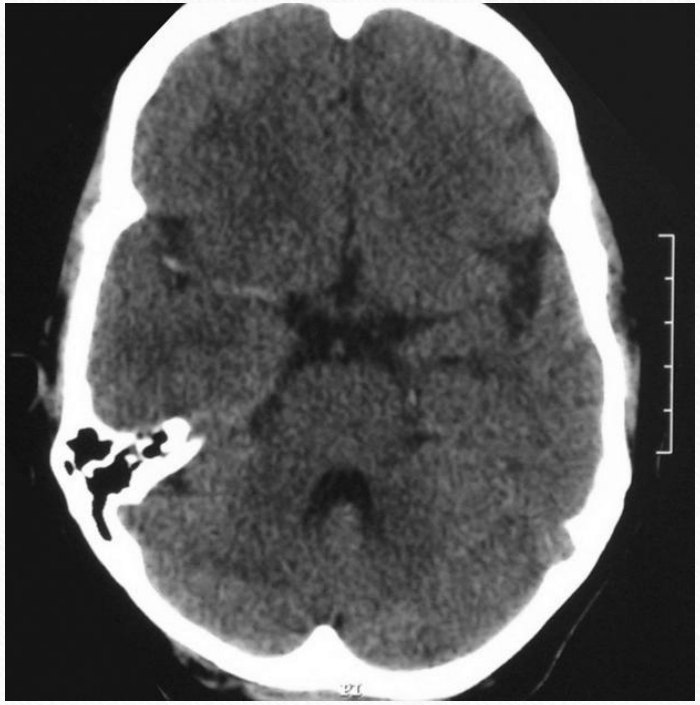
- Presentation
  - Focal neurological deficit, headache, seizure…
- Etiology
  - Embolic (cardioembolic, arterioarterial emboli, paradoxical emboli)
  - Thrombotic
  - Dissection

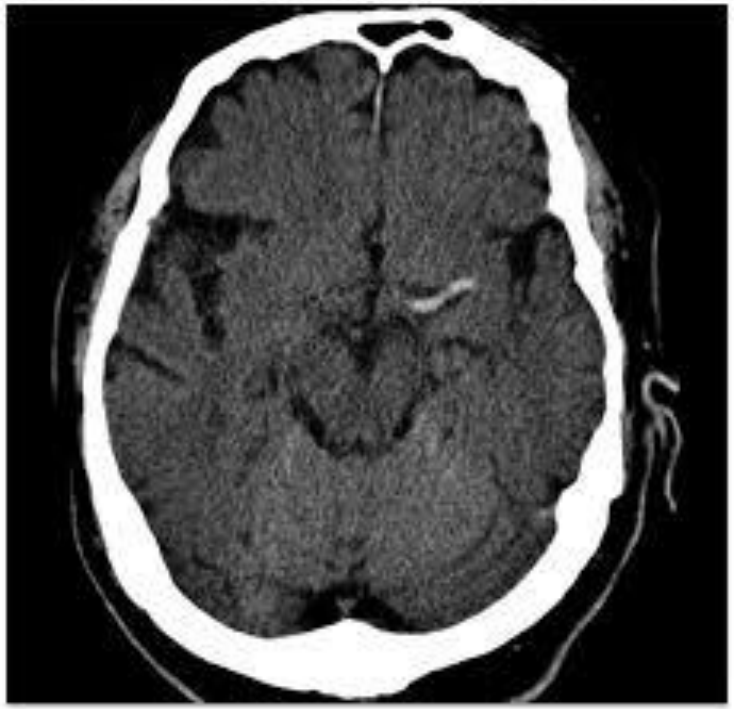


Ischemic stroke (cont.)

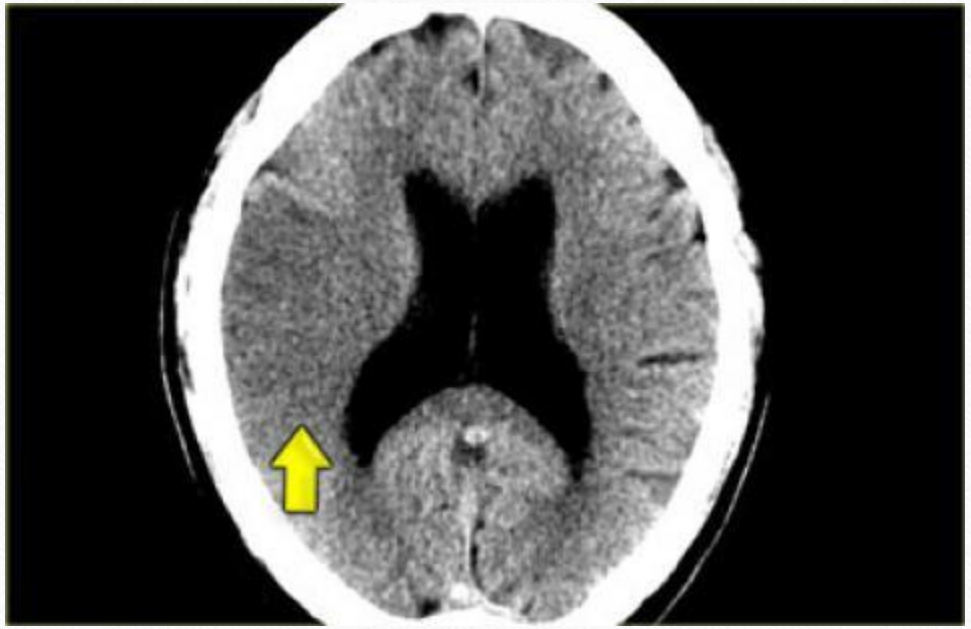
- Diagnostic approach
  - **CT scan**
  - MRI Diffusion weighted imaging
- ***Never ever start treatment (ASA, clopidogrel, anticoagulant) without CT scan***

CT patterns (dense MCA sign)



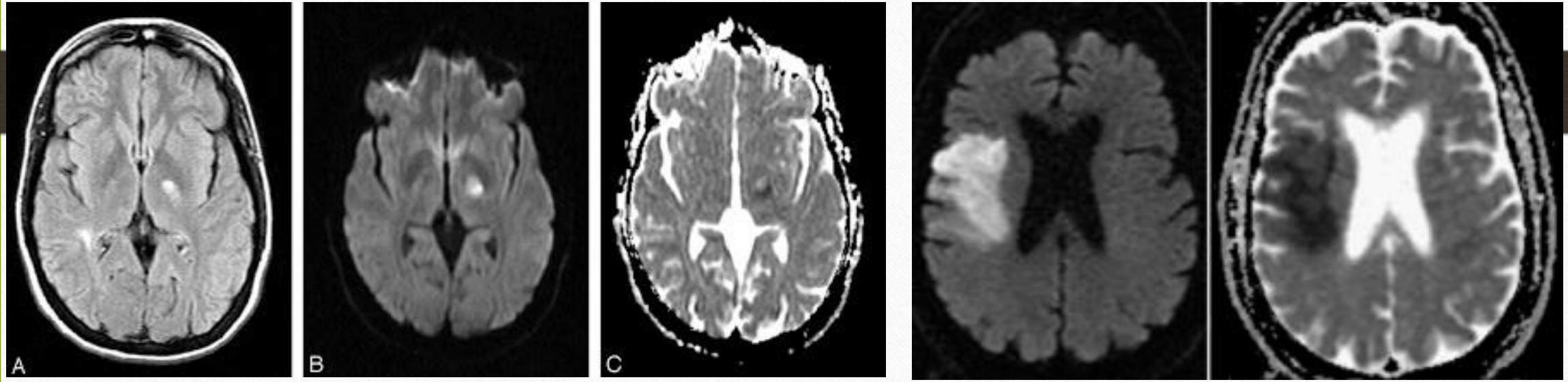


Parenchymal Ischemic changes



Hemorrhagic transformation

Diffusion weighted MRI



Facts

- Nutrition of Neurons → Merely Glucose and keton bodies
- No store of energy in neurons

  - → Ischemic intolerance of neurons

Questions

- Blood flow cessation → Neuronal death
- Is it correct?
- How much time it takes for neuron to die after blood flow cessation?
- What happens if blood flow get restored?

Facts

- Complete interruption of blood flow
  - → suppression of electrical activity in 12 to 15 s
  - → inhibition of synaptic excitability in 2 to 4 min
  - → inhibition of electrical excitability in 6 min

Facts

- Normal Cerebral Blood Flow (CBF)
  - → 50 – 55 mL/100g per minute
- What if CBF decreases but does not stop?
  - CBF < 18mL/100g → Electrical failure
    - Reversible
  - CBF < 8mL/100g → Membrane Failure
    - Irreversible

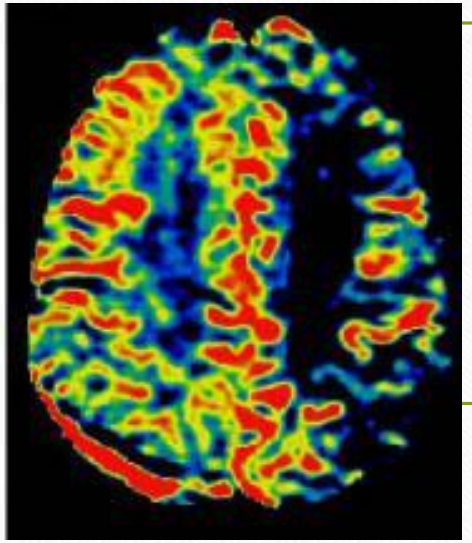
Question

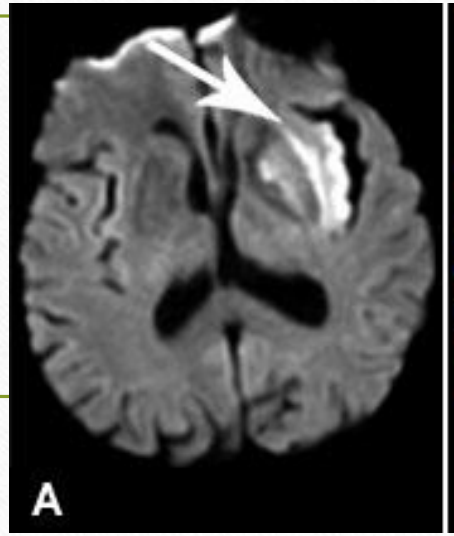
- Transient Ischemic Attack
  - What is TIA?
  - How is it possible?

Facts

- Diffusion and Perfusion study
  - Detection of reduced perfusion(CBF) in brain
  - Defining Diffusion/Perfusion mismatch concept

Penumbra

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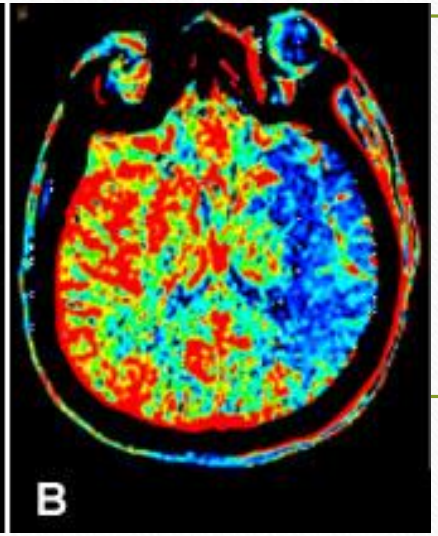
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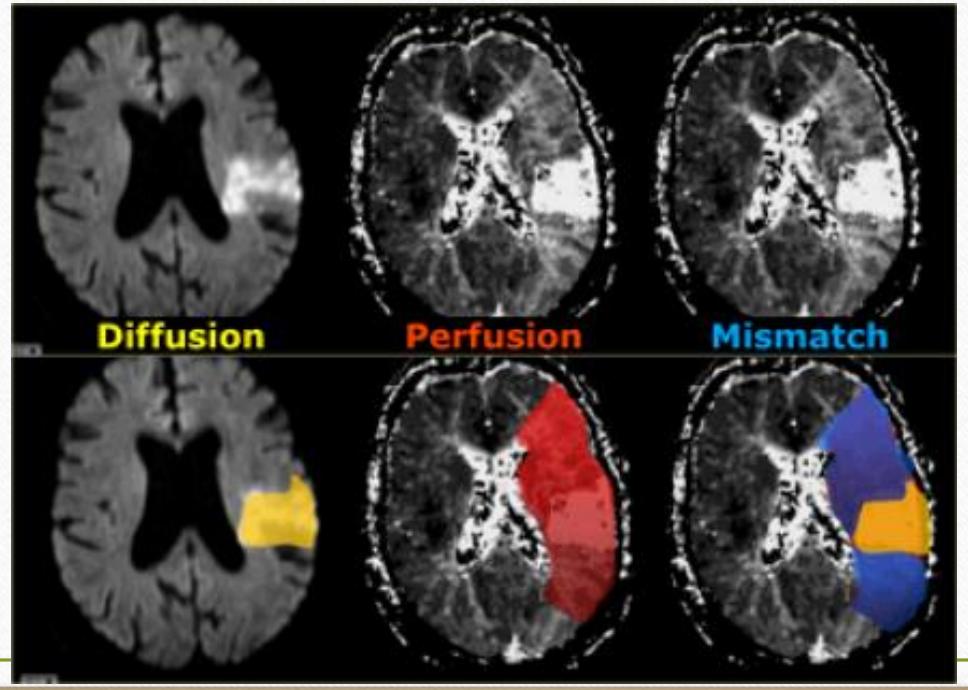
Diffusion
Perfusion
Mismatch

Fibrinolytic therapy

- IV Alteplase (rTPA)
- Up to ***4.5 hours*** after stroke
- Hemorrhagic stroke should be ruled out by CT or MRI

Alteplase contraindications

- Stroke mimics (hypo/hyperglycemia, seizure/todd's paralysis)
- Bleeding risk
  - Drugs (anticoagulants i.e. warfarin, enoxaparin, heparin, NOACS)
  - Prior insult resulting in bleeding susceptibility (2w trauma, 2w surgery, 3w GIB, GI malignancy, endocarditis)
  - Aortic dissection
- ICH risk
  - Prior cranial insult (ICH, surgery, tumor, giant aneurysm)
  - Prior stroke, trauma, surgery 3months

Alteplase Cautions

- Pregnancy
- Pericarditis
- Cardiac thrombosis

Mechanical Thrombectomy

- Up to 6 hours after stroke ± thrombolytic
- If large vessel occlusion is detected in imaging studies
  - → Brain MRA/ CT angiography

Patient management

- Blood pressure
  - **In the first day 220/110**
- Blood sugar
  - Control with insulin
- Nutrition
- Fever

Secondary prophylaxis

- Antiplatelet
- Statin
- Evaluation for other causes of stroke
  - Echocardiography, ECG holter-monitoring, vascular evaluation …
  - → Treat as needed

Thanks for your patience