

Lecture (6)

Common Brain Diseases By Dr.Aloraini

Hanan Alrabiah

Hanan Alsalman

Maha Alkubaidan

Reem Aljurayyad

Ayshah Almahboob

Khawla Alothman

Ghadeer Alwuhyd

Dalal Alqadi

Suliman Alshammari

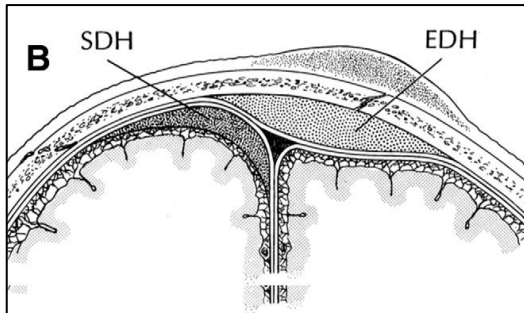
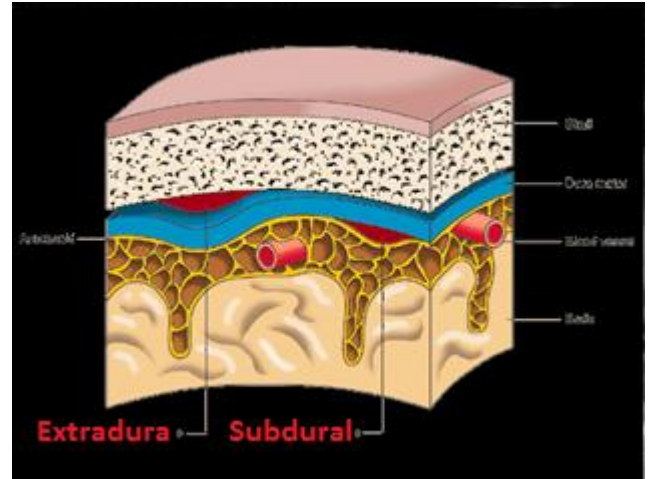
Rawabi Alghamdi

Resources:

- Lecture by dr.Aloraini
- Recording.

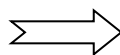
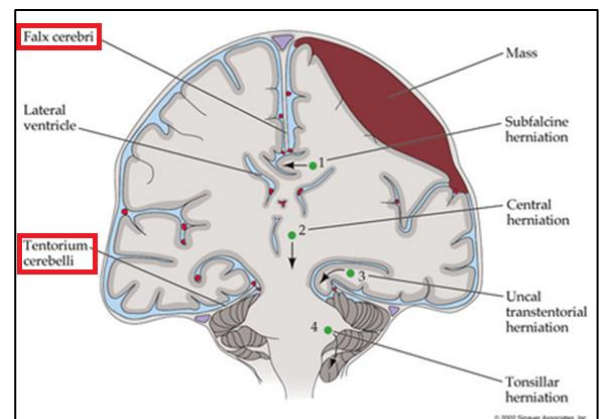
Intracranial Bleeding

- **Intraparenchymal hemorrhage:** bleeding within the brain tissue.
- **Intraventricular hemorrhage:** bleeding in the ventricles.
- **Subarachnoid hemorrhage:** bleeding between the brain and arachnoid mater.
- **Subdural hemorrhage:** bleeding between the arachnoid and dura mater.
- **Extradural or epidural hemorrhage:** bleeding between the dura mater and bone of the skull.



Epidural Hemorrhage:

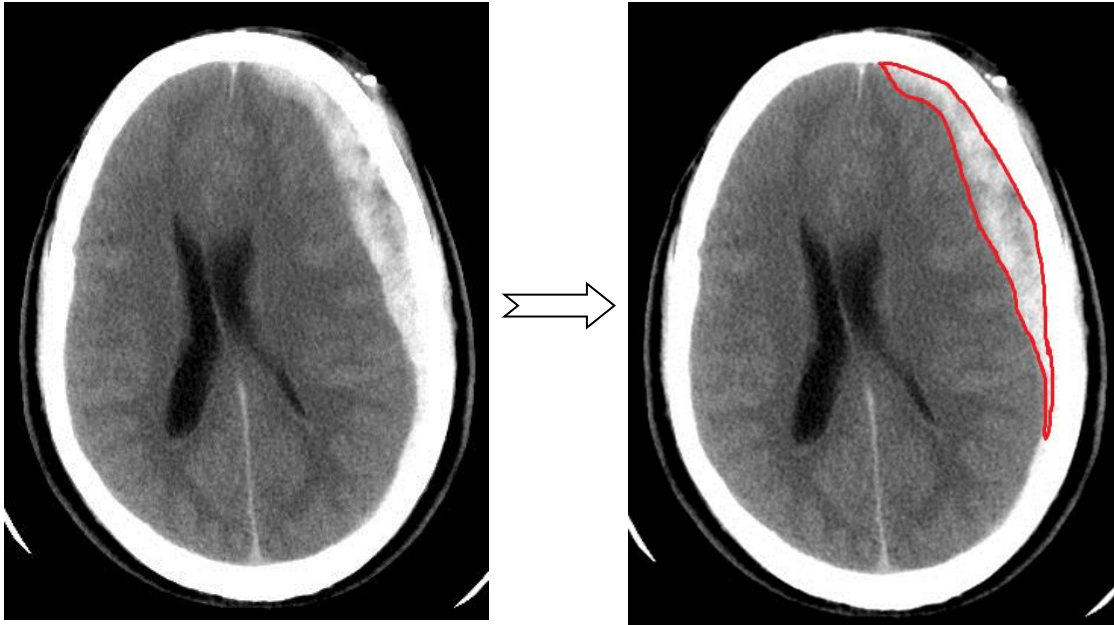
- Blood collection between inner table and dura.
- **Biconvex (lenticiform)**
- Occur at site of impact
- 95% unilateral, supratentorial
- **Does not cross sutures**
- **Can cross falx and tentorium**
- Skull fracture in 90%
- Air seen in 20%
- Arterial 90%, Venous 10%
- Nontraumatic-rare
- Lucid interval-50%
- C/F: headache, nausea, vomiting, convulsions, herniation.



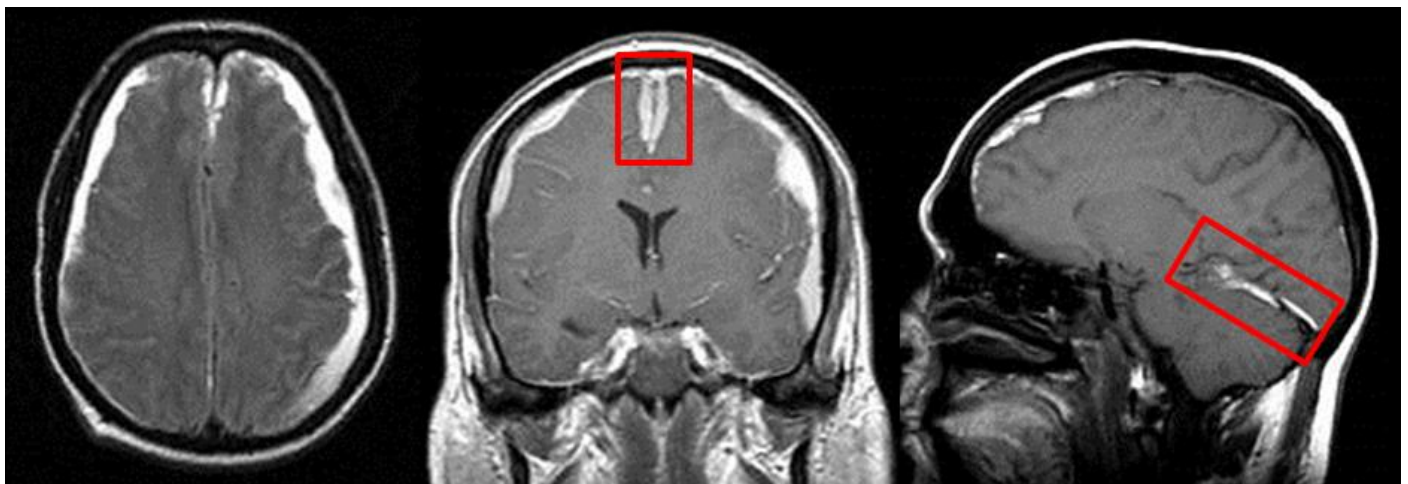
A lenticiform hematoma – not filling the subarachnoid space (the sulci are clear) → epidural.

Subdural hemorrhage (SDH):

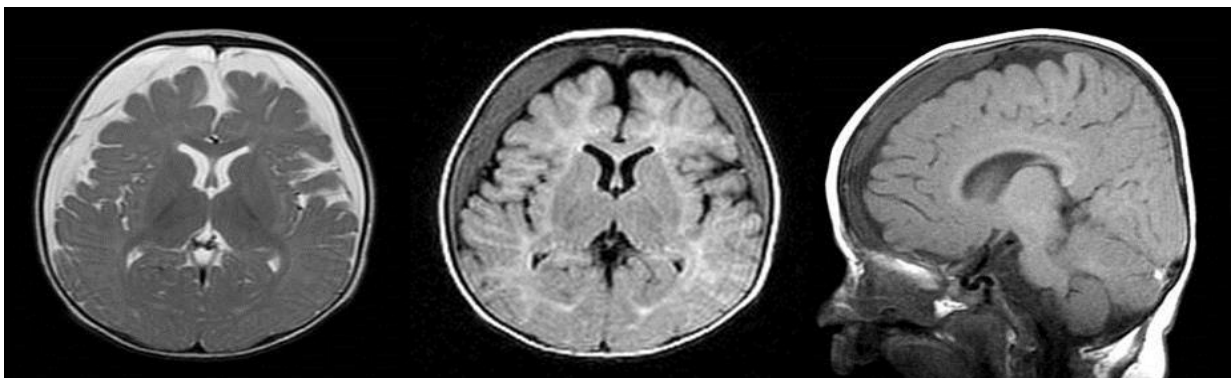
- Blood collection between dura and arachnoid.
- **Crescent shape**
- **Supratentorial**
- **Cross sutures, but not dural attachments**
- May extend along falx and tentorium
- **Trauma is the most common cause**
- **Acute: 6hr-3d**
- **Subacute: 3d-3w**
- **Chronic: >3w**

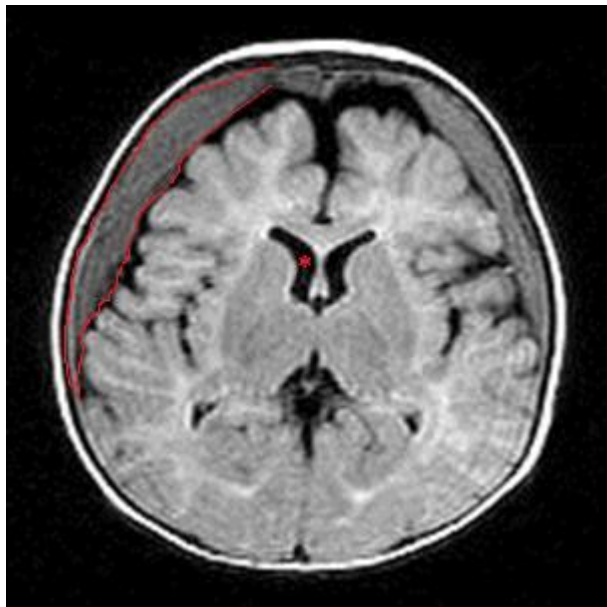


A crescent shape crossing the sutures → subdural hematoma (SDH)

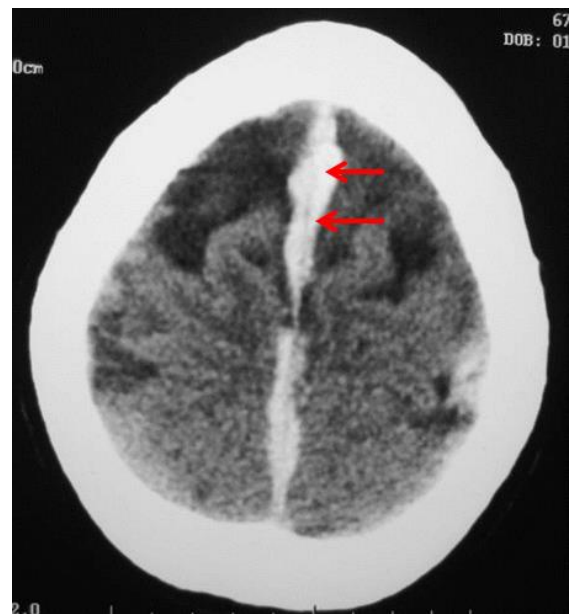


subdural hematoma the blood will fill the fissure goes along with dura mater.

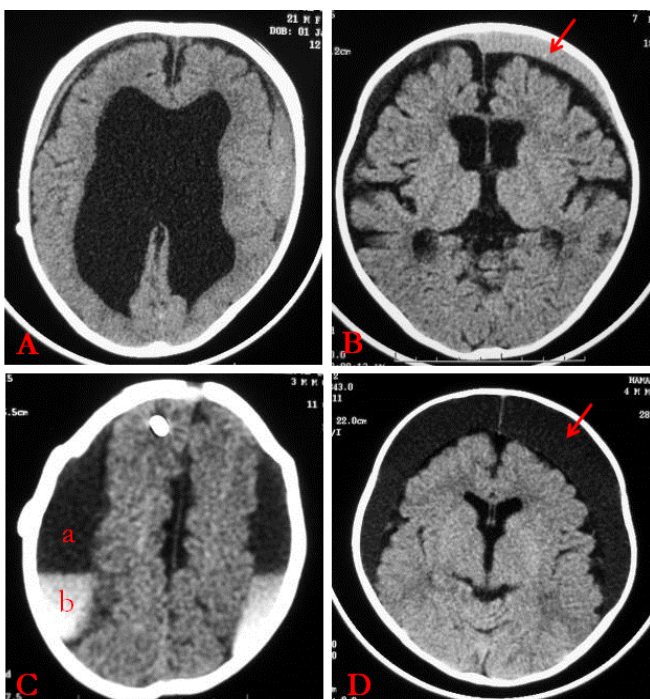




- Chronic bilateral hematoma
- Why chronic?
 - No mass effect.
 - Not white.

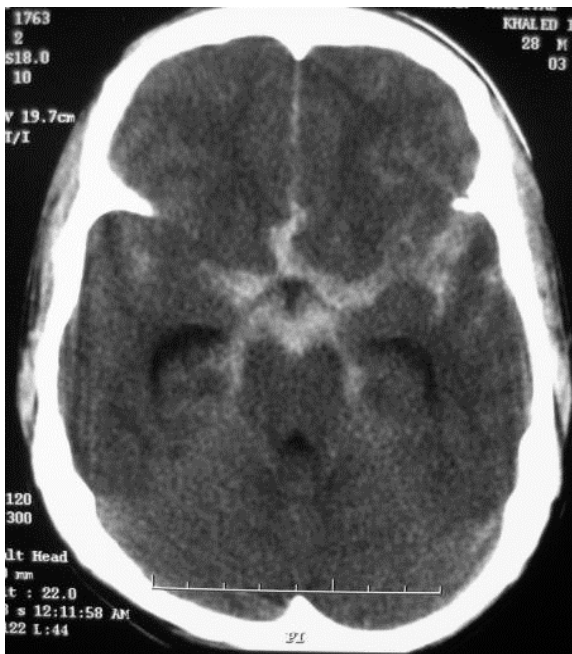


- A: hematoma crosses the falx (white arrow) → epidural
- Right pic: Hematoma goes within the falx (red arrows) → subdual

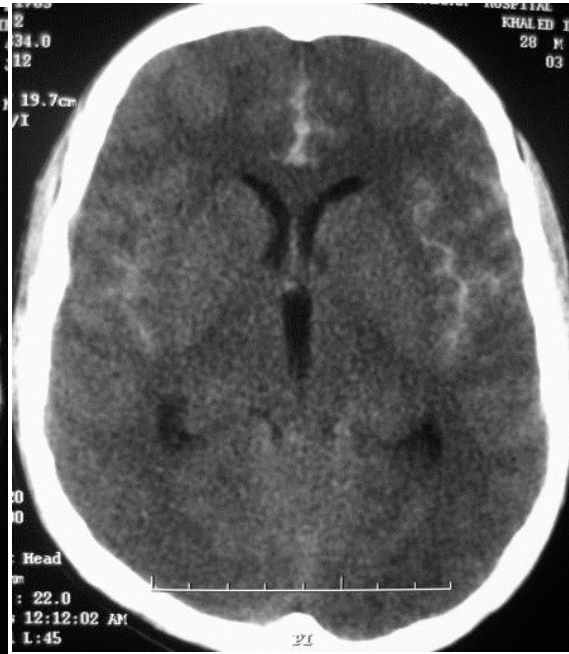


CT scan showed chronic hematoma:

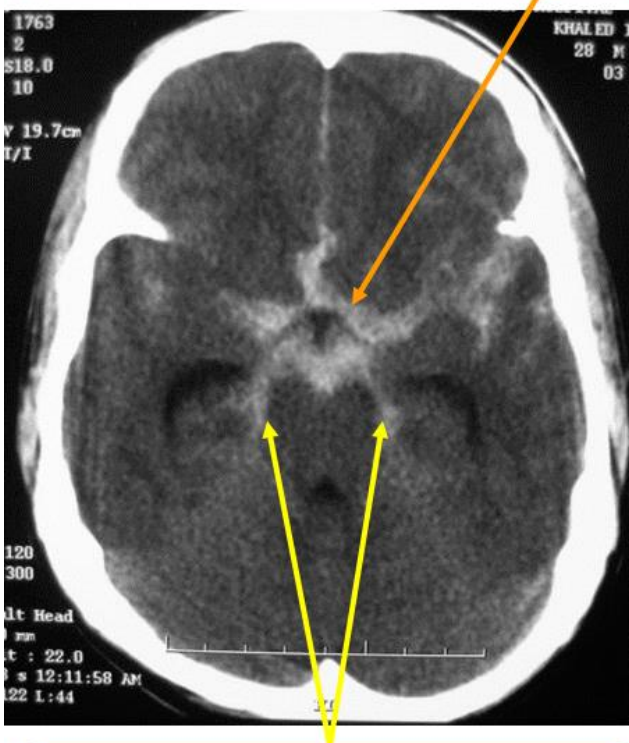
- In Pic B → hematoma (red arrow) does not cross the falx → subdural hematoma (SDH)
- In Pic C: Acute (b) on top of chronic (a) subdural hematoma (SDH).
- Repeated subdural hematoma is an indication of child abuse (non accidental injury).
- In Pic D: chronic subdural hematoma.
 - Why chronic? Because the hematoma appears grey (with time it becomes fluid) while in acute hematoma appears white in C.T scan



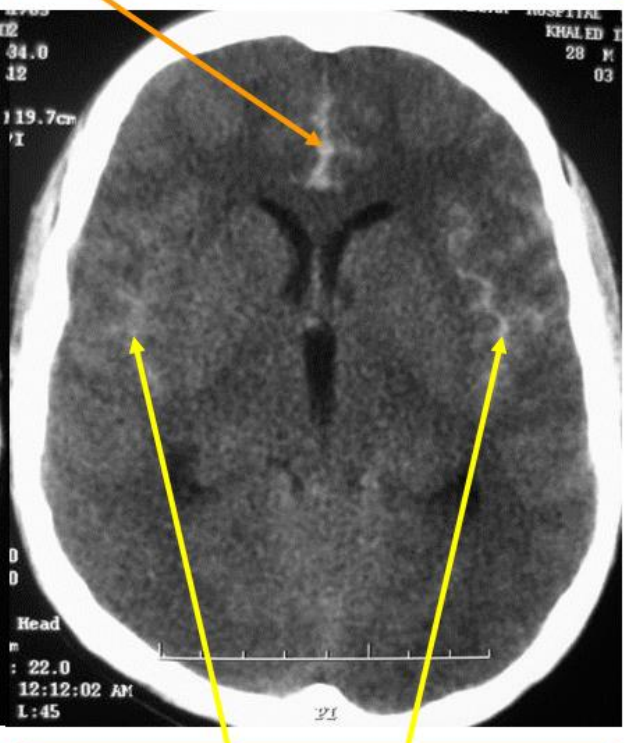
Blood in the suprasellar cistern



Blood in the interhemispheric fissure



Blood in the ambient cistern



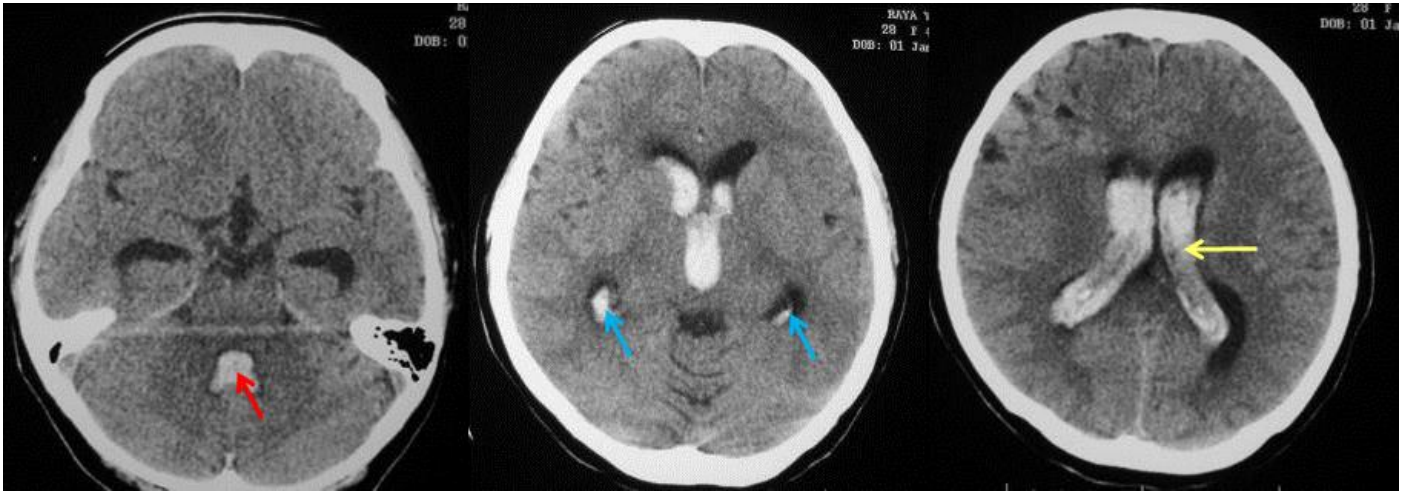
Blood in the sylvian fissures

Subarachnoid Hemorrhage (SAH):

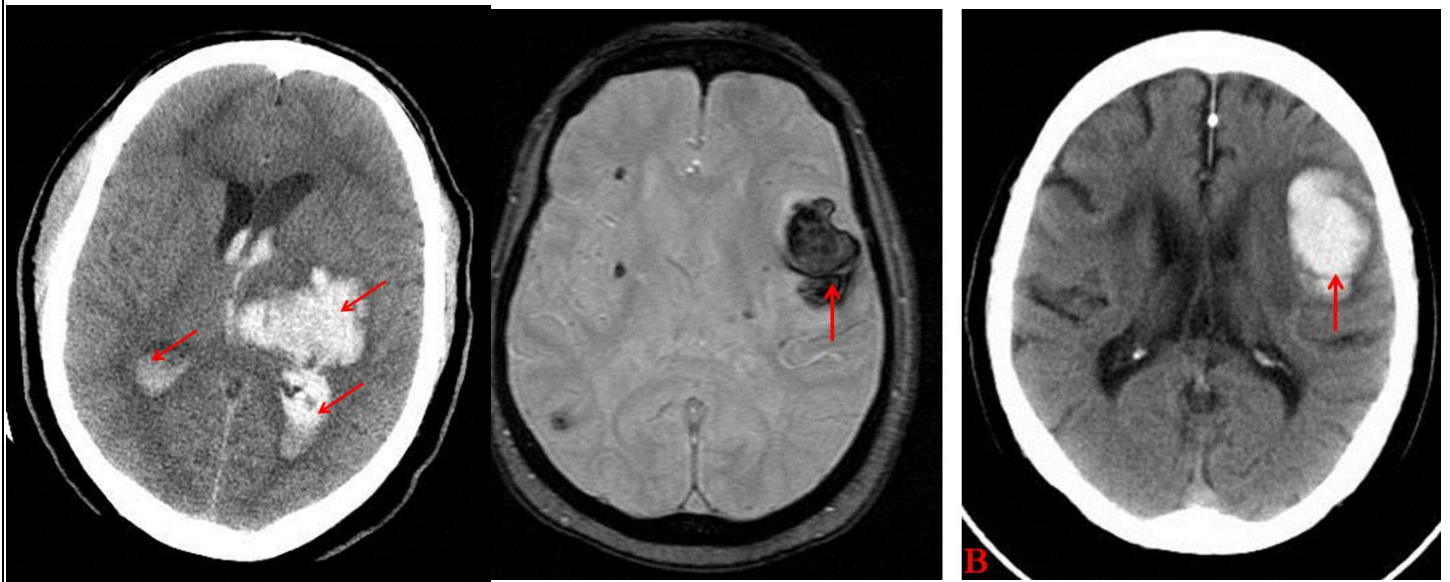
- Blood between pia and arachnoid
- **Traumatic (most common)**
- Nontraumatic
- C/F: headache, vomiting, blurred vision, neck rigidity (because blood is irritant to meninges so it causes aseptic meningitis).
- Complications: hydrocephalus* (acute/delayed), vasospasm, rebleeding.

* blood in SA space makes a blood clot → obstructing foramen of monro or 4th ventricular outflow → ventricular ballooning → herniation → brain ischemia → death.

Intraventricular hemorrhage:



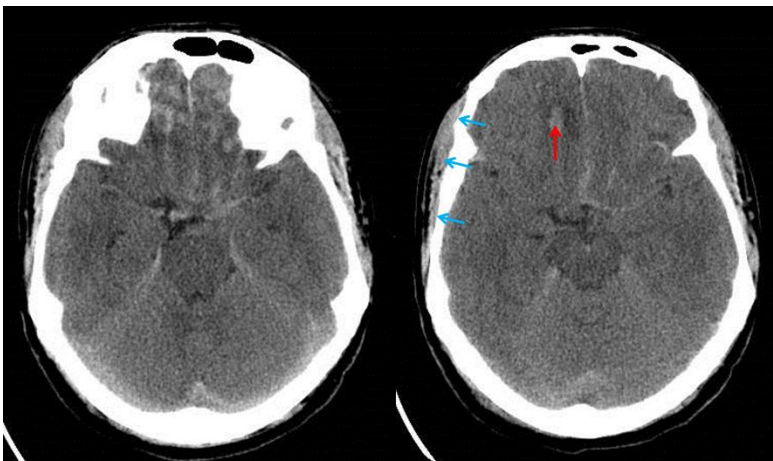
- Intra ventricular bleeding by parenchymal bleeding
- 4th ventricle (Red arrow)
- 3rd ventricles (blue arrows)
- Lateral ventricles (yellow arrow)



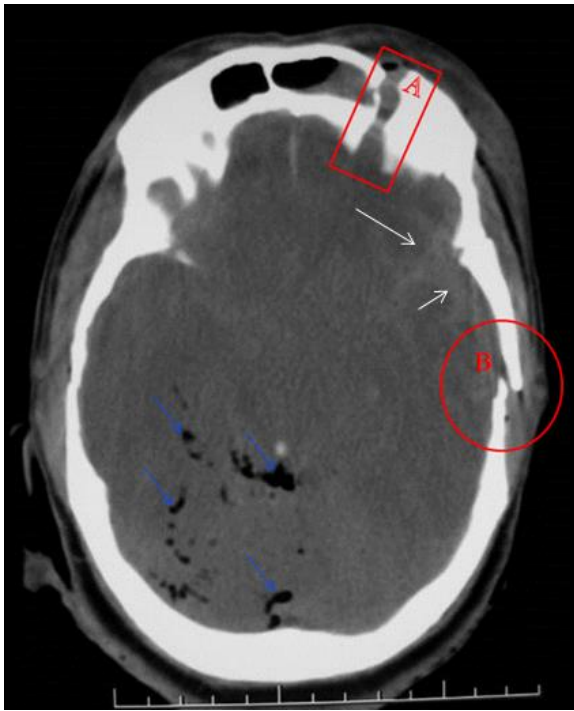
Parenchymal bleed:

■ Causes:

HTN, trauma, AVM, aneurysm, permaternity, tumors, infarction, coagulopathy (most commonly in intra parenchymal).

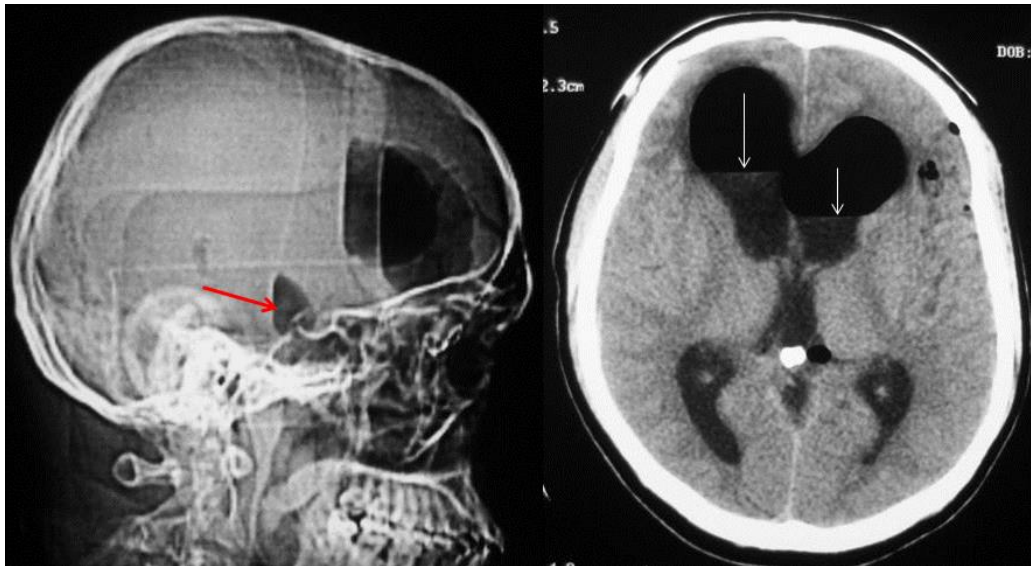


- Intraparenchymal hemorrhage (red arrow).
- Extra cranial hemorrhage (blue arrows) outside the bone.

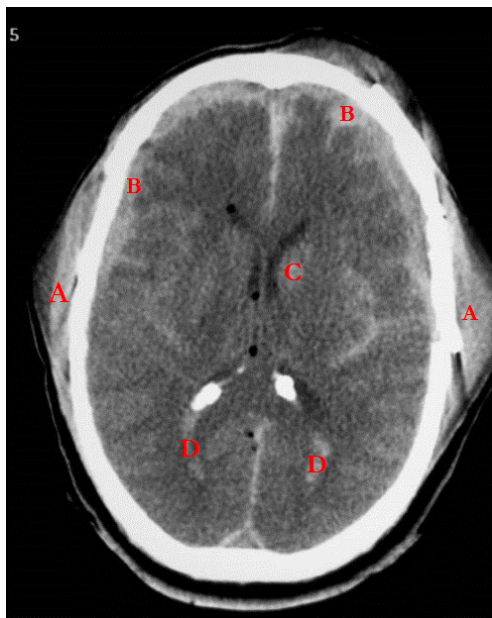


- Sub arachnoid hematoma (white arrows)
- Air (blue arrows)
 - Which one of the fractures caused the air to escape into the intracranial cavity? Fracture A.
 - Why? Because fracture A is an open fracture causing the air (from sinuses) to escape inside the brain tissue
 - Note: once the air enters the intracranial cavity it will move along with the CSF fluid based on the position of the head.

Trauma:

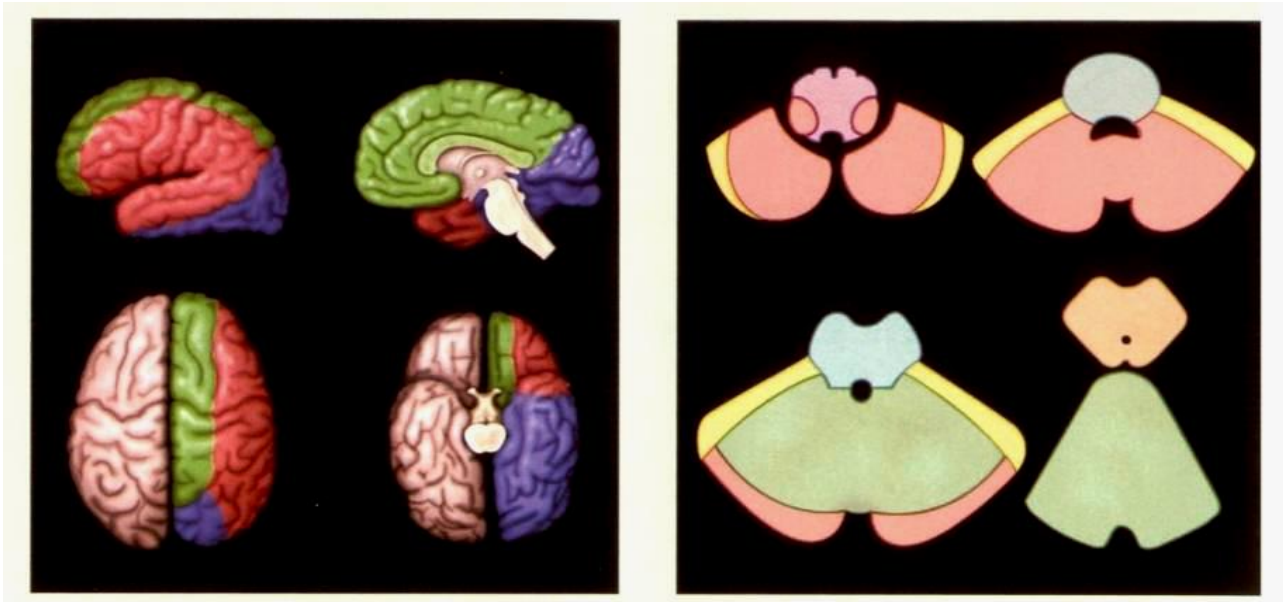


Chronic hematoma in the 4th ventricle (red arrow) with CSF (white arrow)

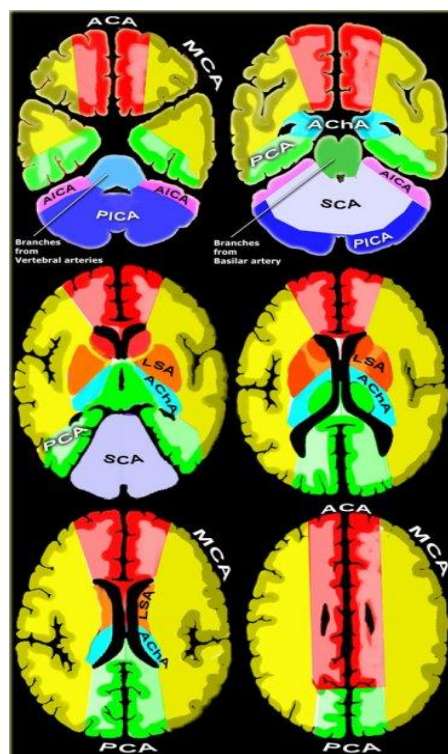


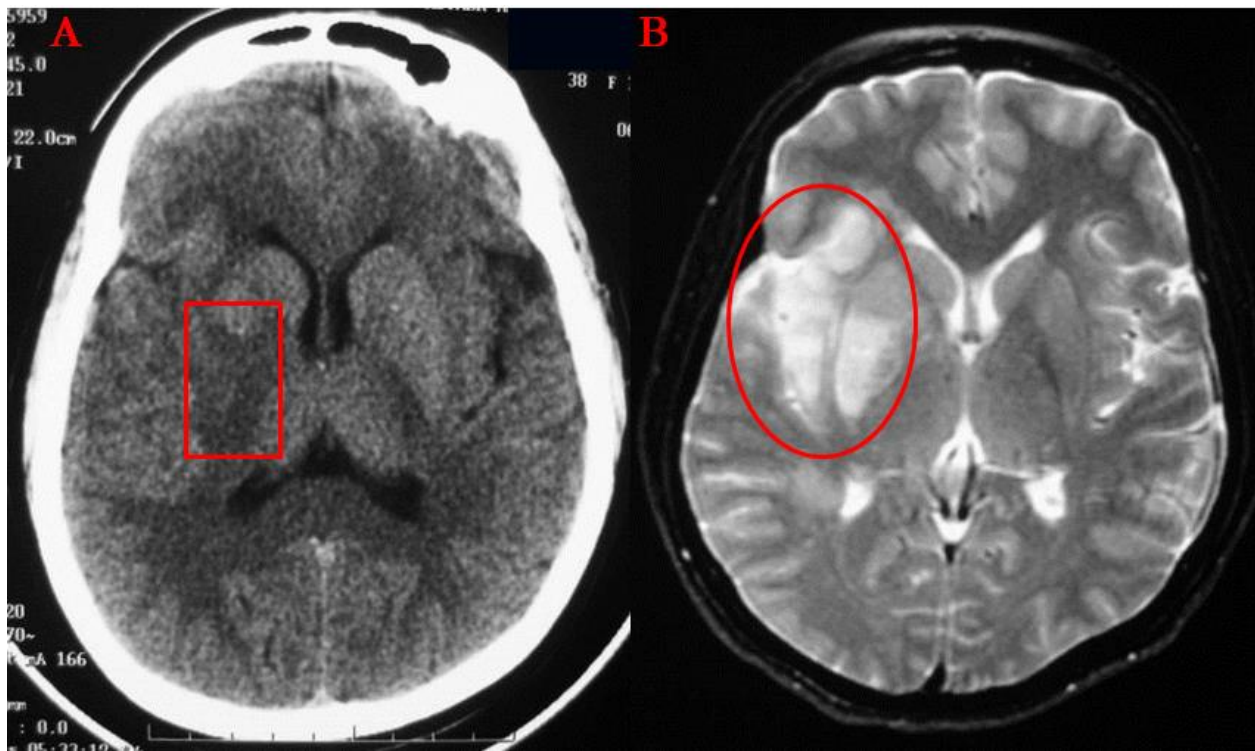
- A: extra cranial bleeding (outside the bone)
- B: subdural hemorrhage.
- C: intra Parenchymal bleeding (in the head of Caudate nucleus)
- D: intraventricular bleeding

Infarctions

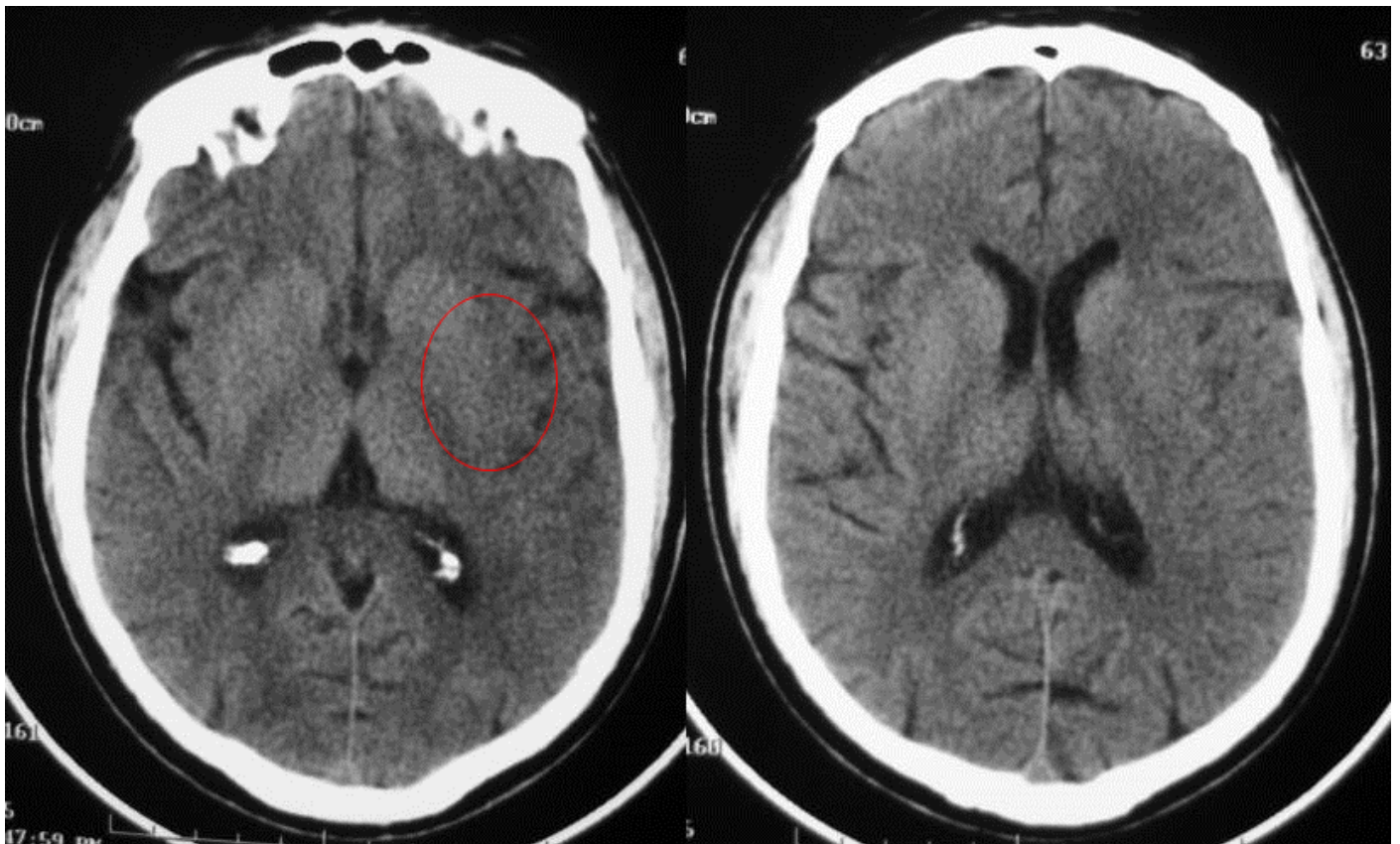


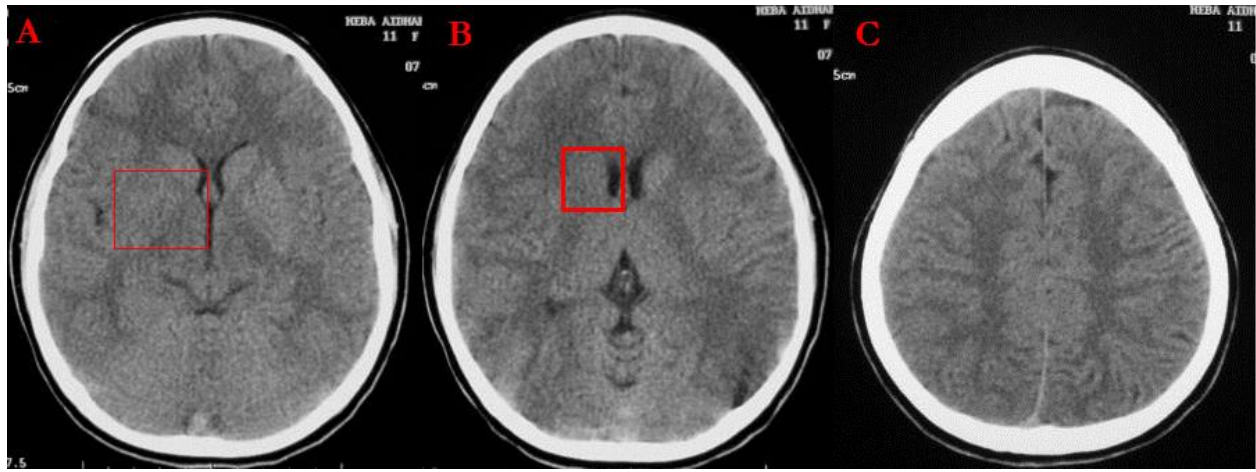
- Anterior cerebral artery (ACA) supplies the medial aspect of frontal lobe (Green).
- Middle cerebral artery (MCA) supplies the lateral aspect of the frontal lobe (Red).
- Posterior cerebral artery (PCA) supplies most of the temporal and occipital lobe (blue).
- Posterior inferior cerebellar artery supplies the post. Part of cerebellum (1).
- Anterior inferior cerebellar artery supplies anterior part of cerebellum(2).
- Superior cerebellar artery(3).



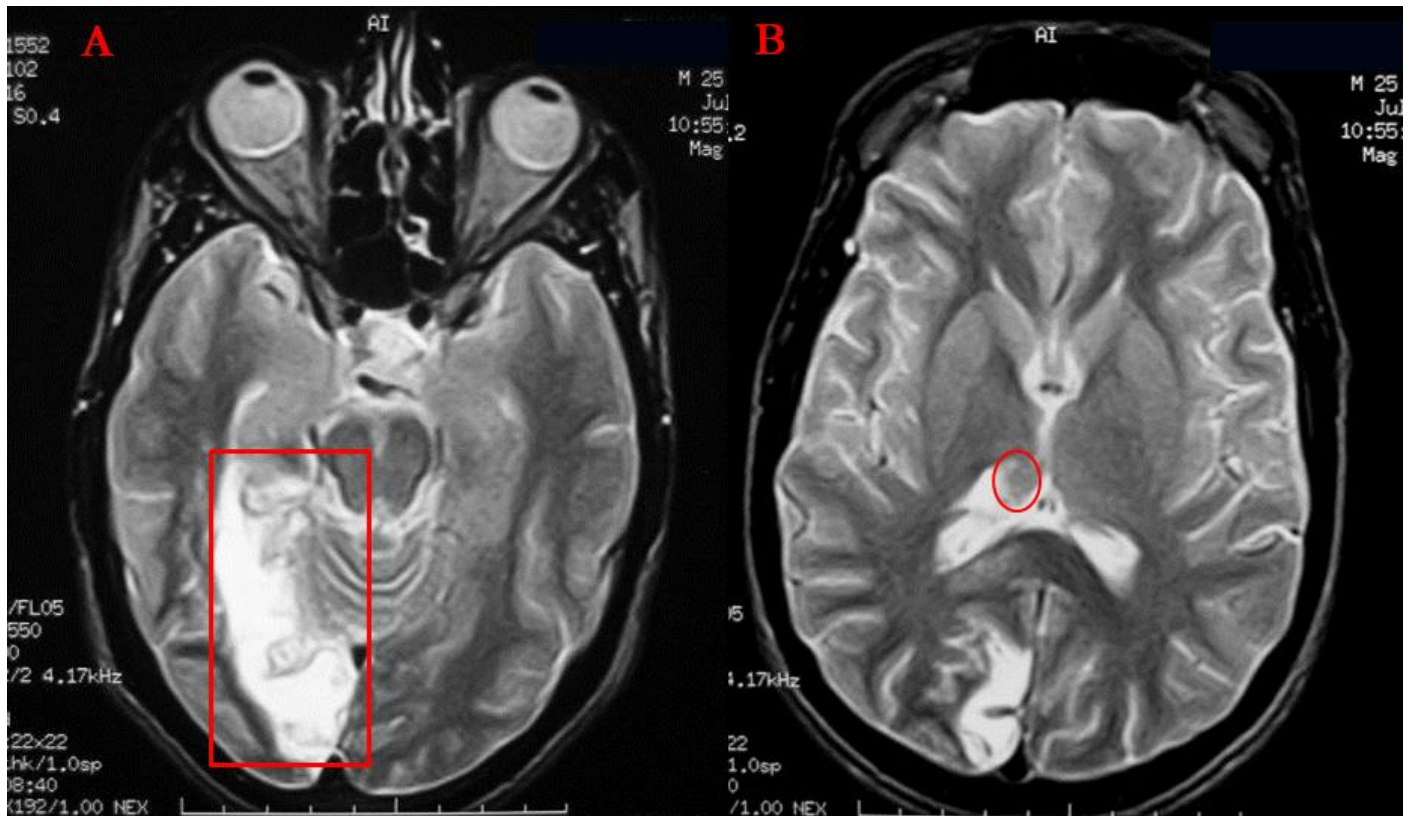


- In pic A: a C.T scan shows absence of post. Part of the basal ganglia at the right side → infarction
- In pic B: MRI shows right sided MCA infarction.

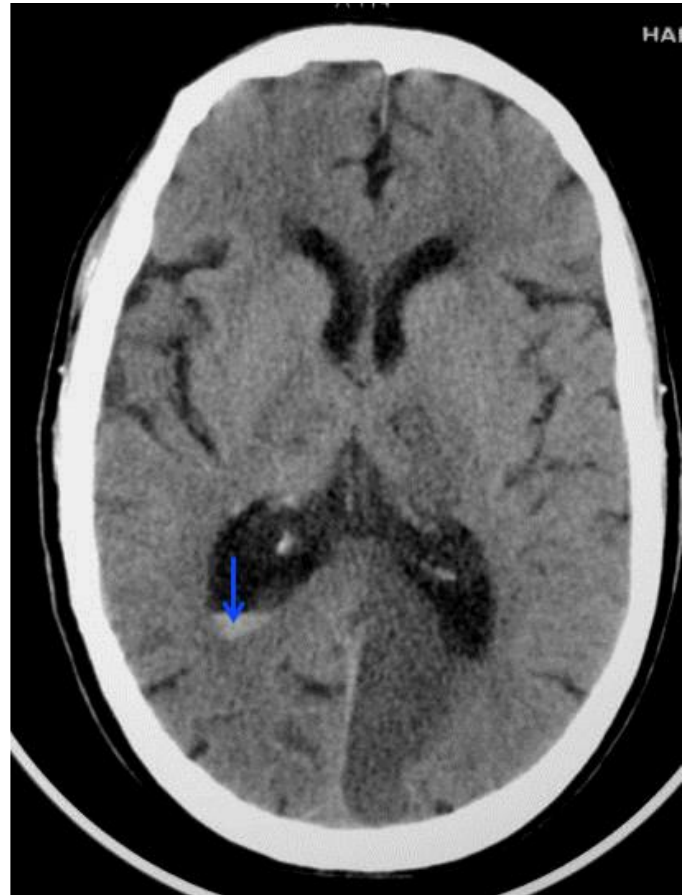
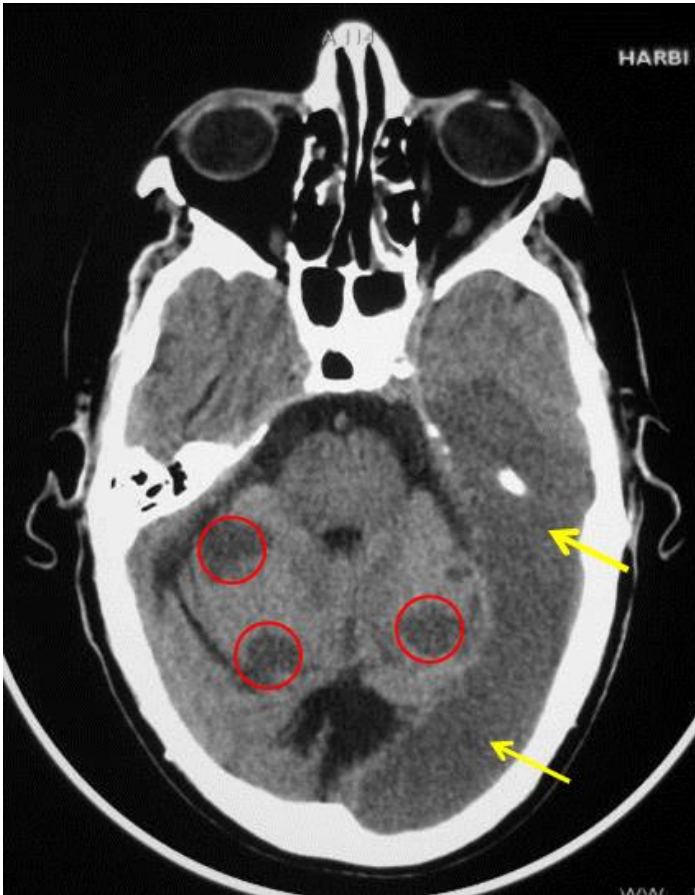




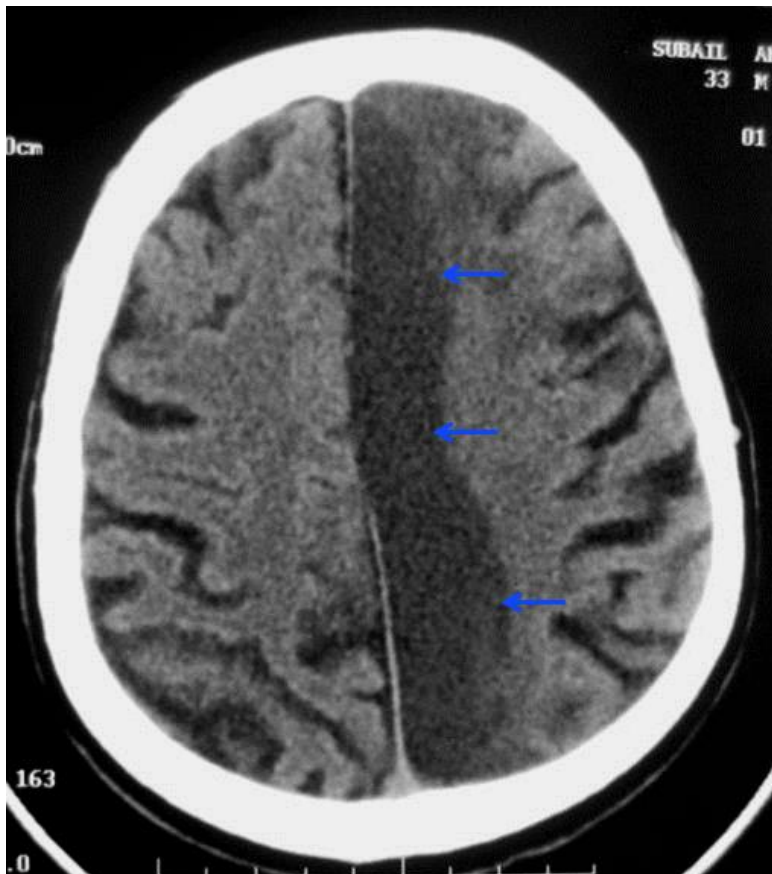
- In pic A: right sided basal ganglia is missing.
- In pic B: right sided caudate nucleus is missing.
- In pic C: absence of the sulci → signs of edema → infarction.



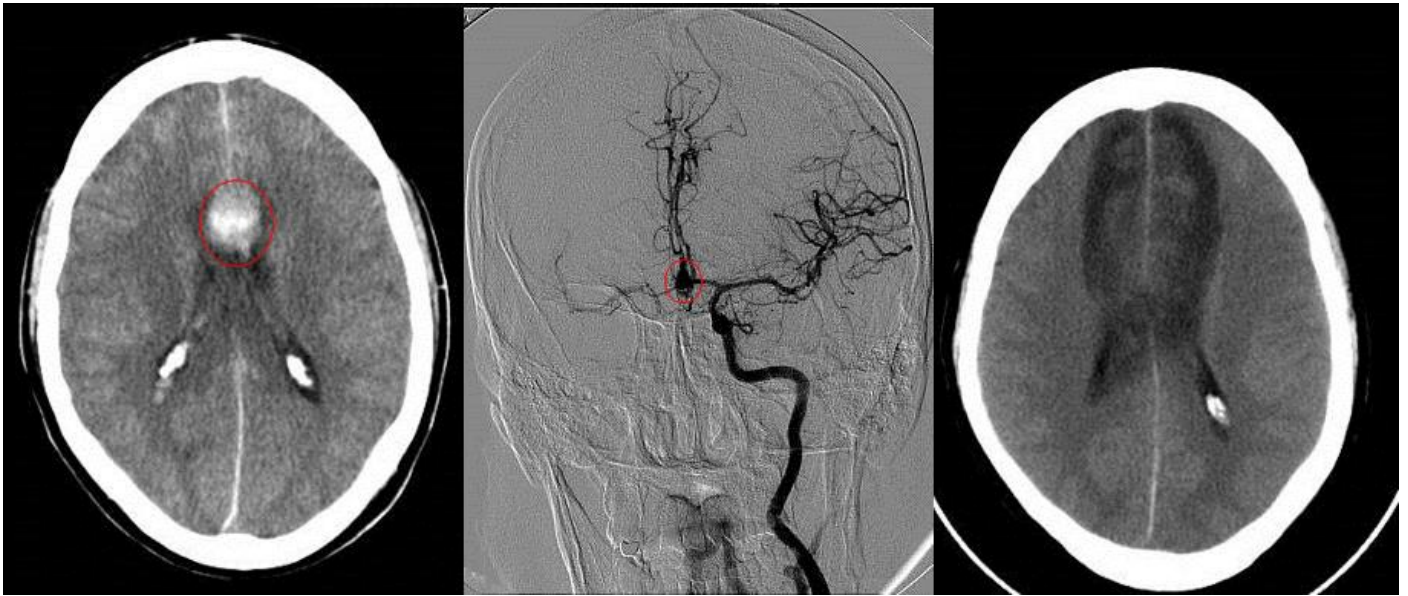
- In pic A: Defect in the right occipital lobe → infarction of PCA.
- In pic B: defect in the right hypothalamus due to PCA infarction.



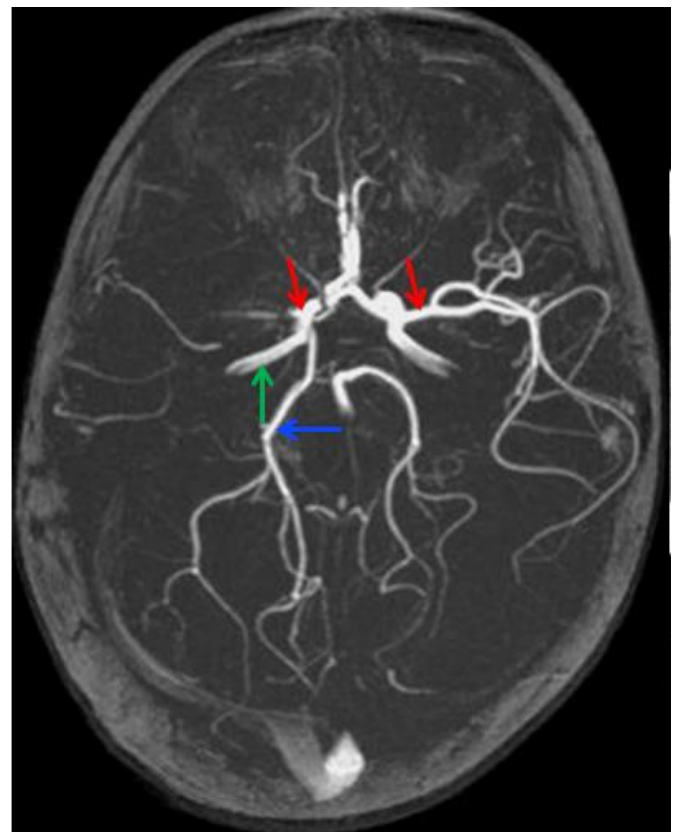
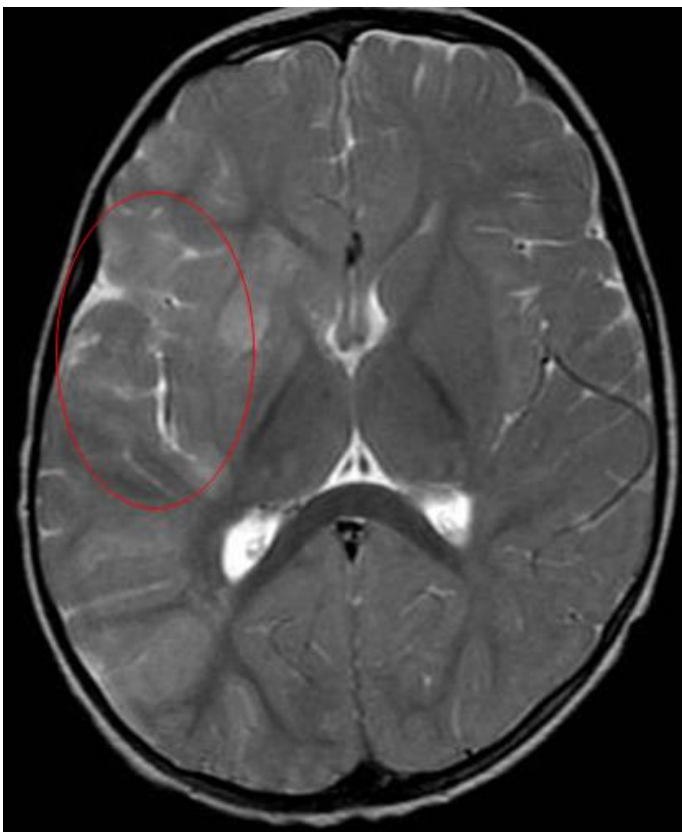
- Multiple to infarction of the cerebellum (red circles).
- Big infarction of PCA affecting temporal and occipital lobe (yellow arrows)
- Intra ventricular bleeding (blue arrow).



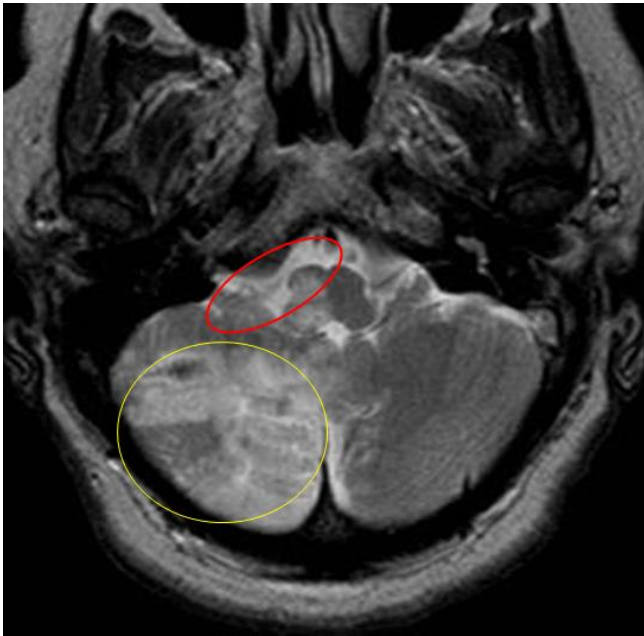
- CT scan shows Infarction of ACA



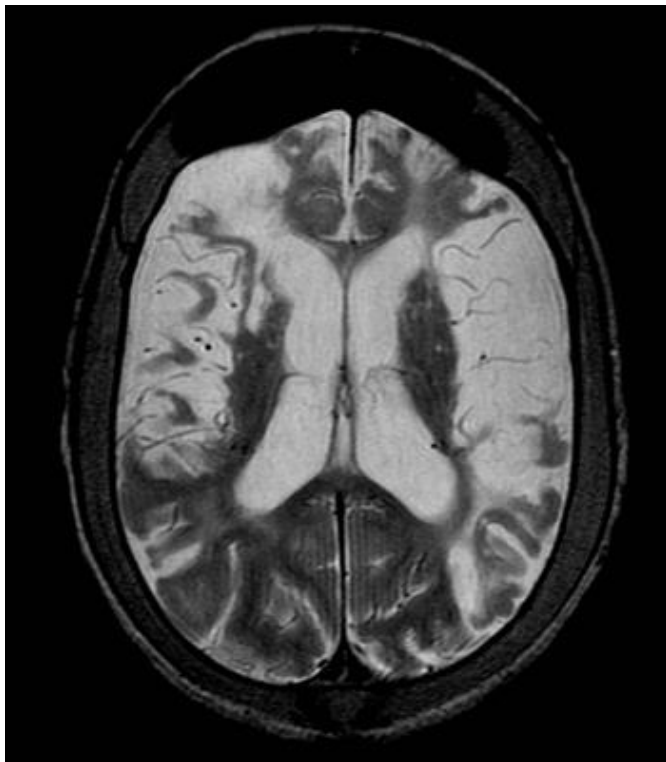
- Bilateral ACA infarction.
- The left pic shows Bleeding due to aneurism



- Left sided pic shows sign of infarction.
- Right sided pic shows right sided MCA occlusion.
- MCA (red arrow)
- PCA (blue arrow)
- Inferior carotid artery (yellow arrow)



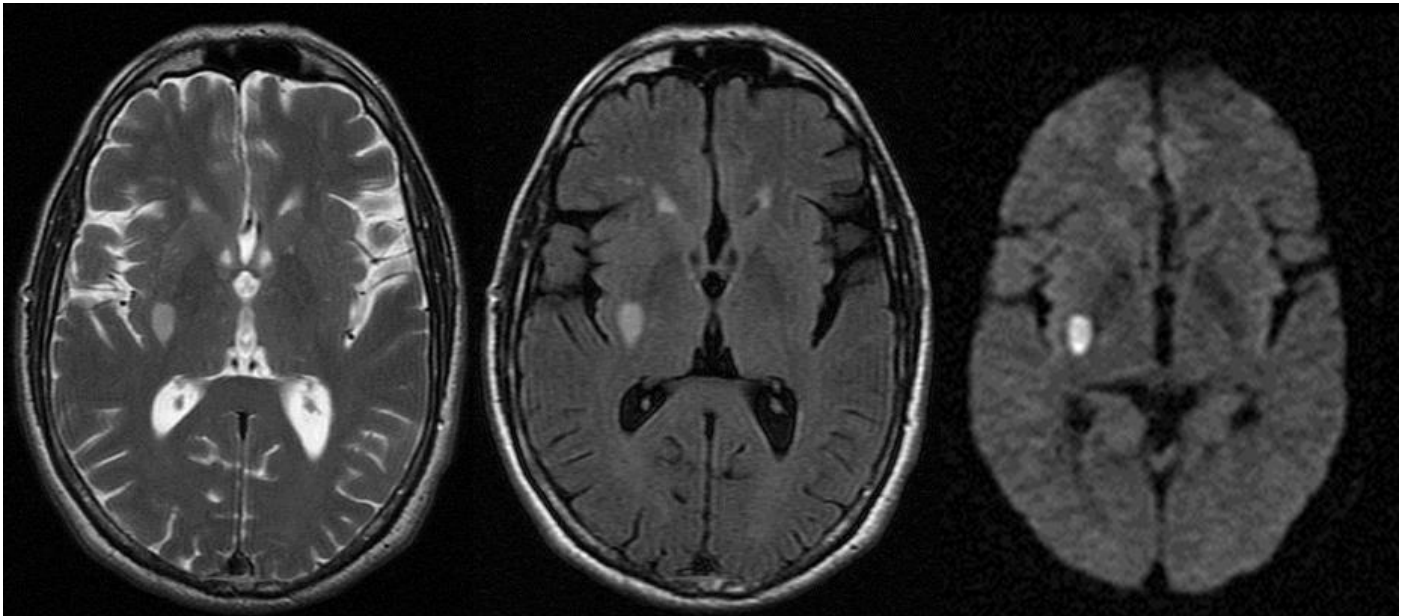
- Lateral medulla (Red)
- Inferior cerebellum infarction due to Posterior Inferior Cerebellar Artery.



- Old infarction of MCA.
- **Why?**
- 1- no mass effect.
- Brain parenchyma will be replaced by fluid in infarction.

- There is loss of volume of brain tissue (thin gyrus and wide sulci) → old swelling
- Repeated arterial fibrillation causes old and new infarction.



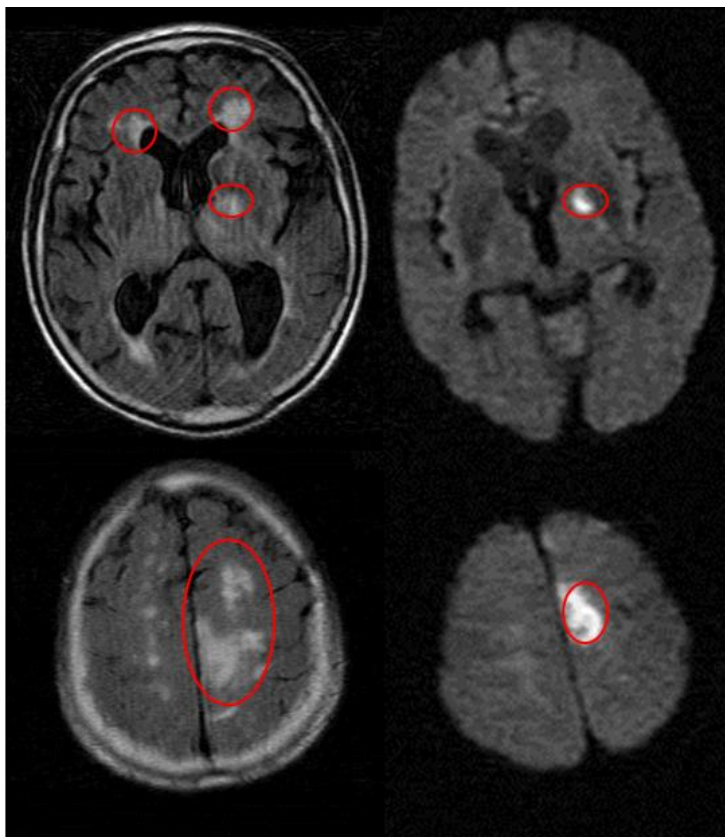


T2WI

FLAIR

DWI

- DWI is new technique to detect the new infarctions (up to 7 days) will light up.



FLAIR

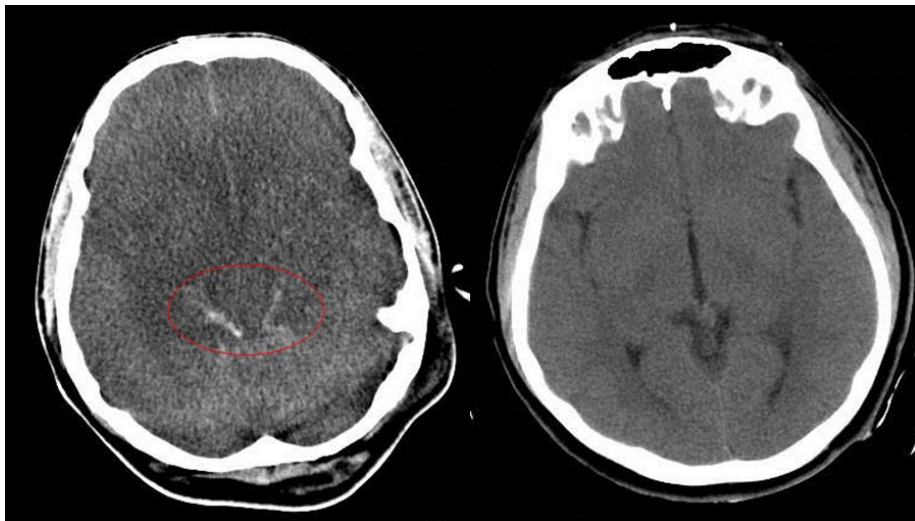
DWI

- FLAIR shows multiple ischemic changes, when DWI is done only new infarctions will light up.

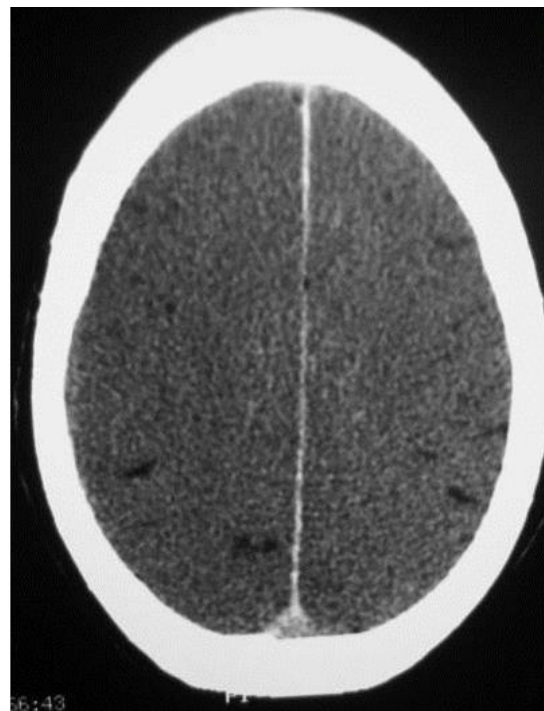
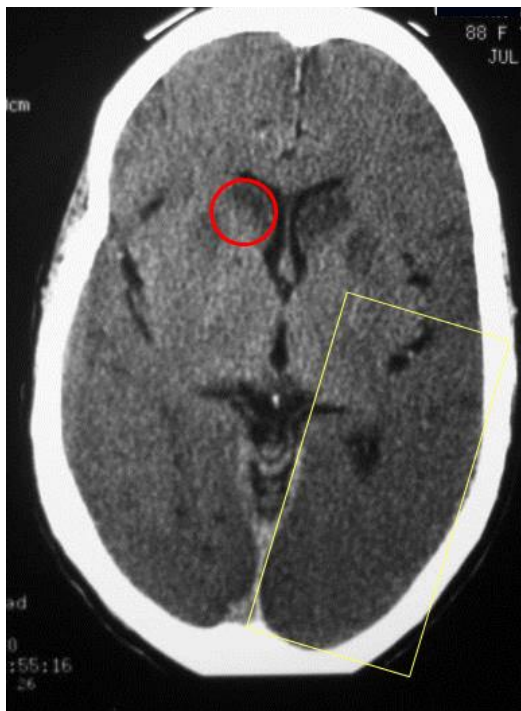
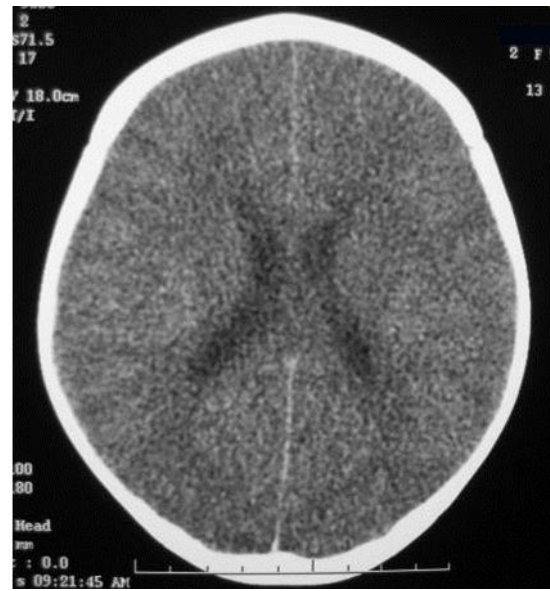
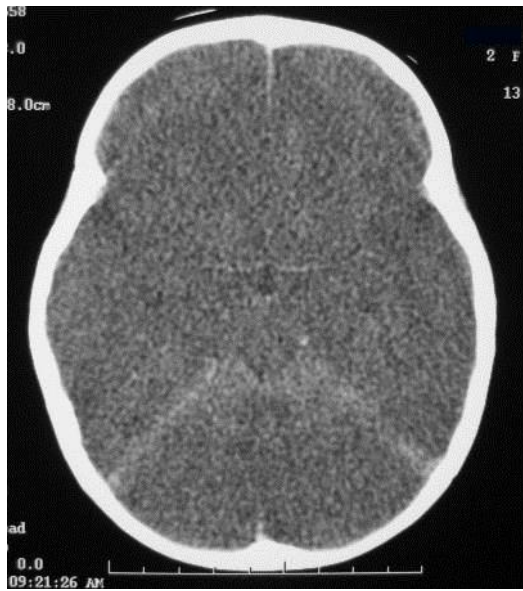
Brain edema

- There are two types:
 - Vasogenic: (leak of fluid from intravascular compartment to interstitial compartment).
 - Trauma/infection/inflammation/tumors
 - Cytotoxic: (defective Na/K pump lead to accumulation of fluid within the cell)
 - Ischemia/trauma
- Both could be generalized or localized
- Both may co-exist
- **Imaging findings: (important)**
 - Hypodensity on CT
 - Low signal on T1, high signal on T2 & FLAIR
 - Loss of GM/WM interface
 - Compressed ventricles
 - Effaced sulci & Cisterns
 - Dense cerebellum
 - Brain herniation
 - Vascular compression-ischemia

Brain edema – anaphylactic shock:

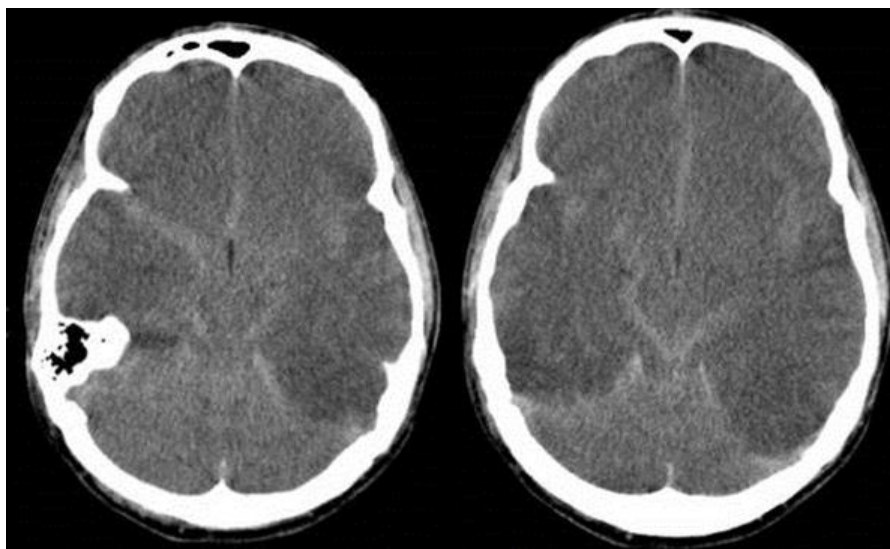


- Compressed blood vessels due to swelled brain
- The pic on the right side after 3 weeks of treatment



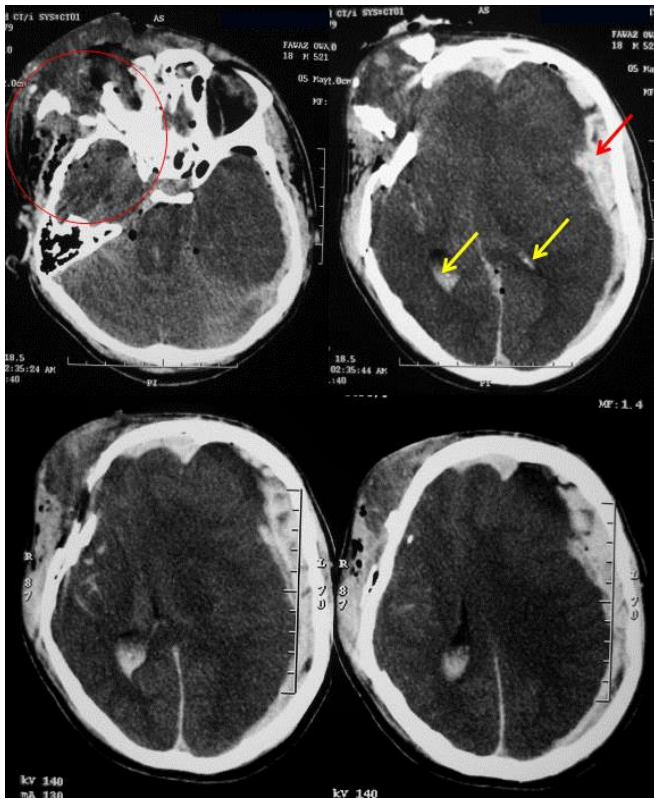
Red → localized lesion on the caudate

Yellow → occipital lobe



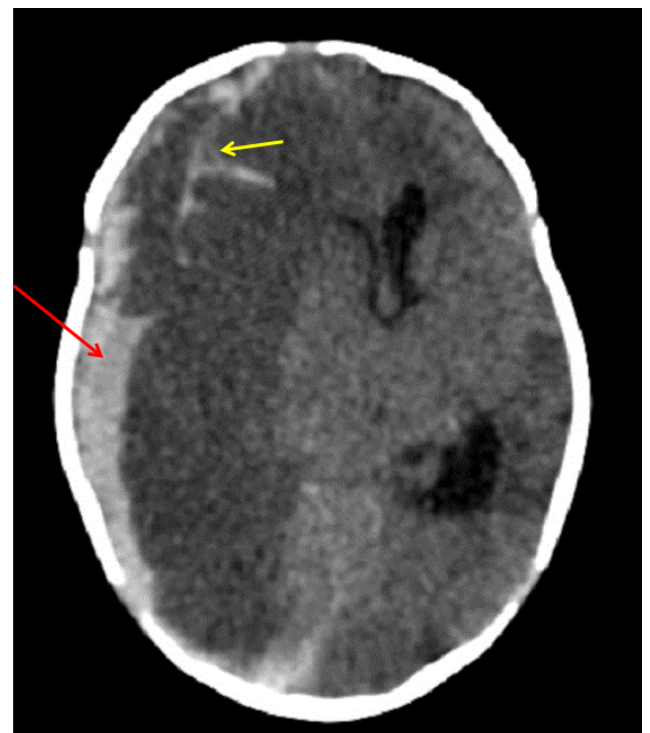
	Vasogenic	Cytotoxic
Location	White matter	Gray matter
DWI	Non-restricted	Restricted
Shape	Finger-like	Diffuse

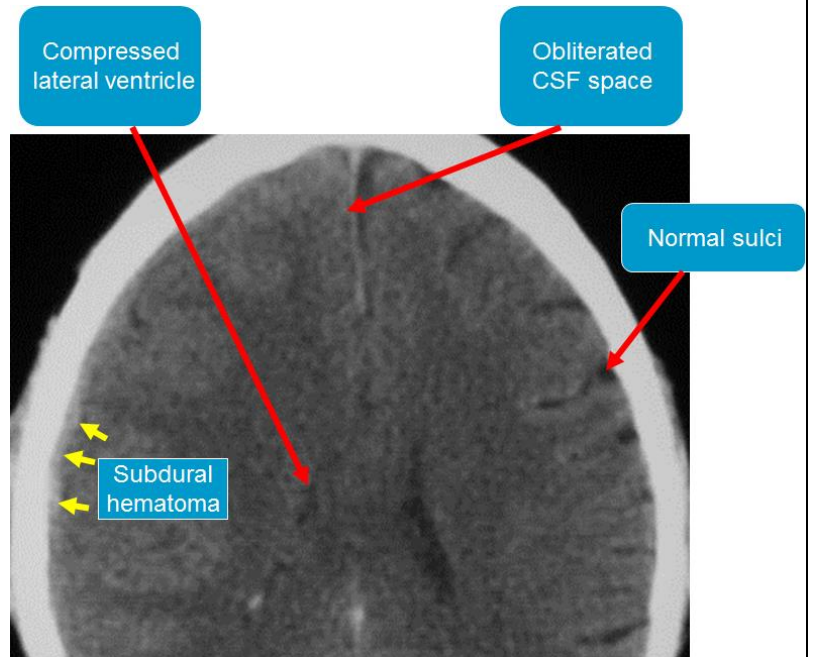
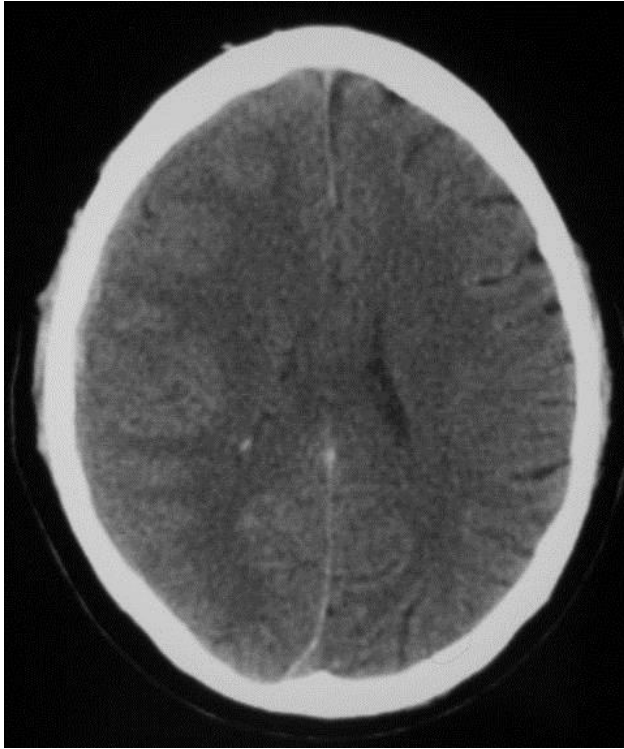
Examples



- Red → base of the skull is smashed
- Red arrow subdural hematoma
- Yellow arrows Intraventricular hematoma

- Red arrow SD
- Yellow arrow infarction





Doctor said: “This is not for Medical students”

Good Luck ☺