

- **Interactive Lecture**
- **of Nervous System**

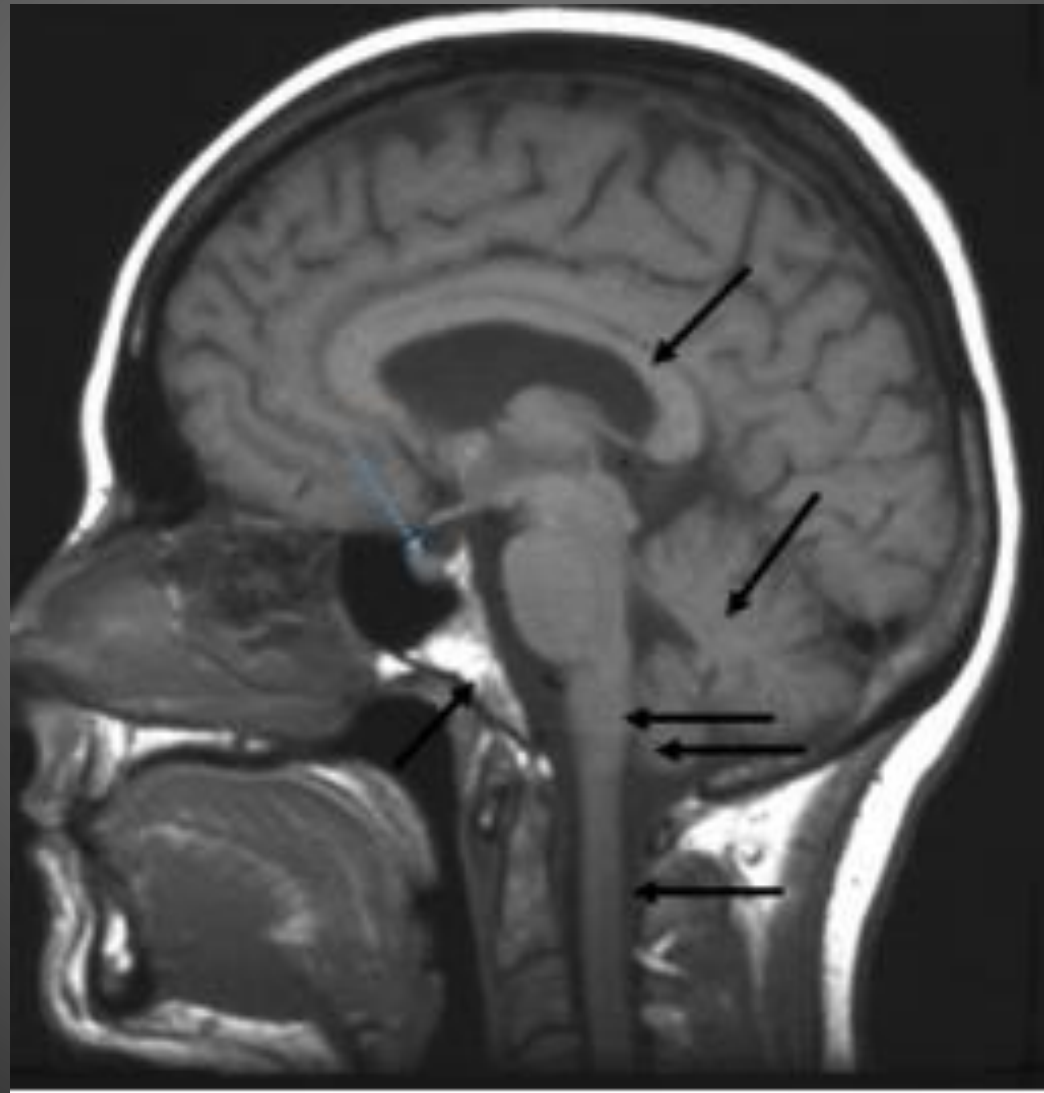
Name the normal anatomical area

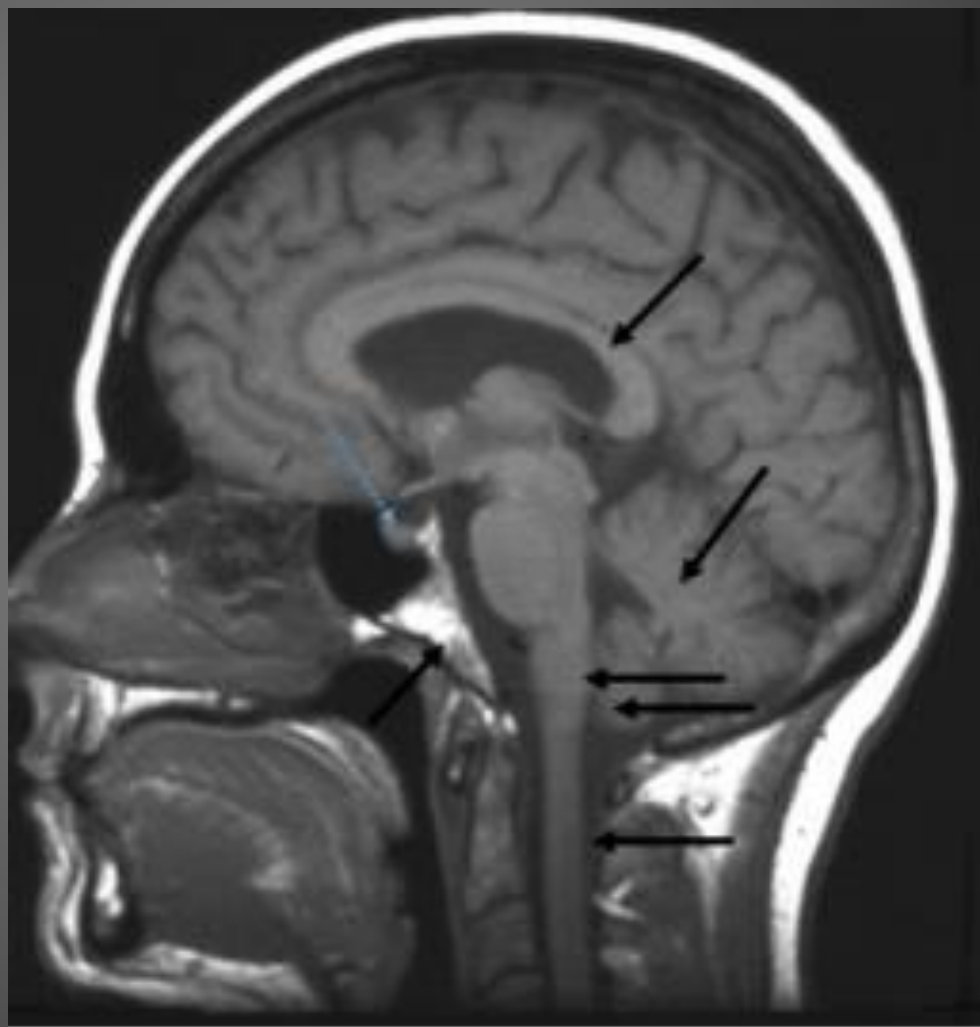


SKULL PA VIEW



Skull X-RAY LAT. VIEW

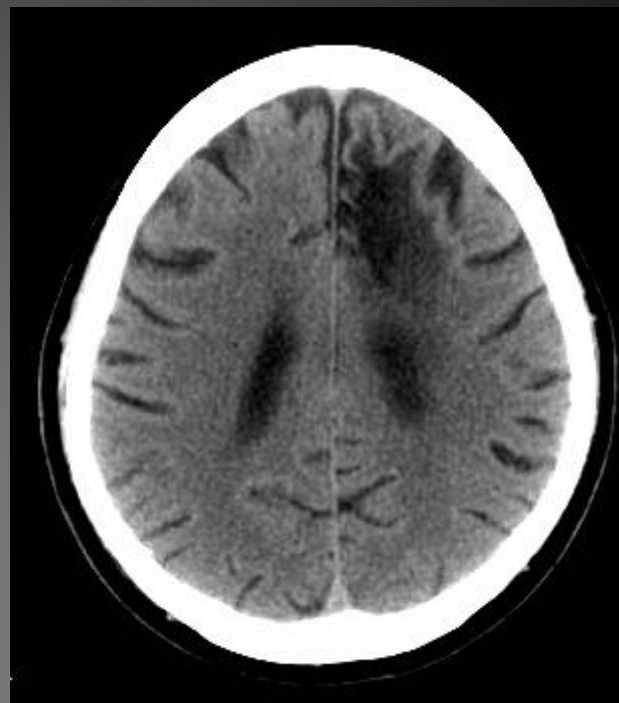




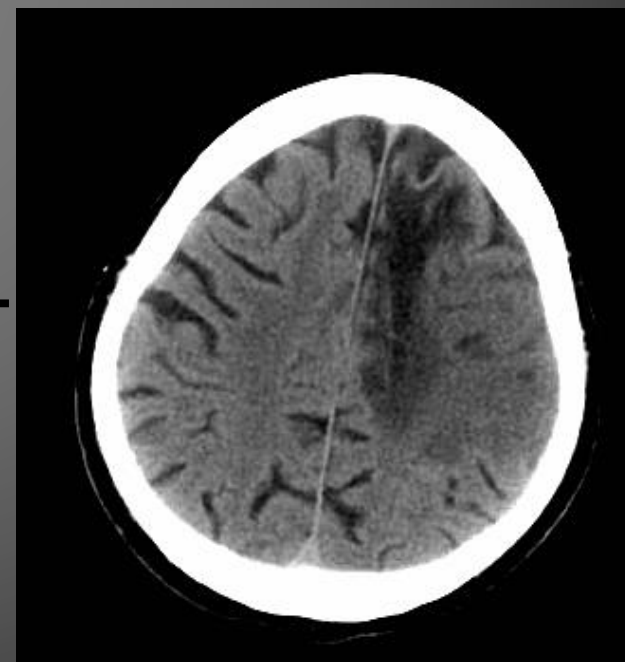
Where is the infarction area?

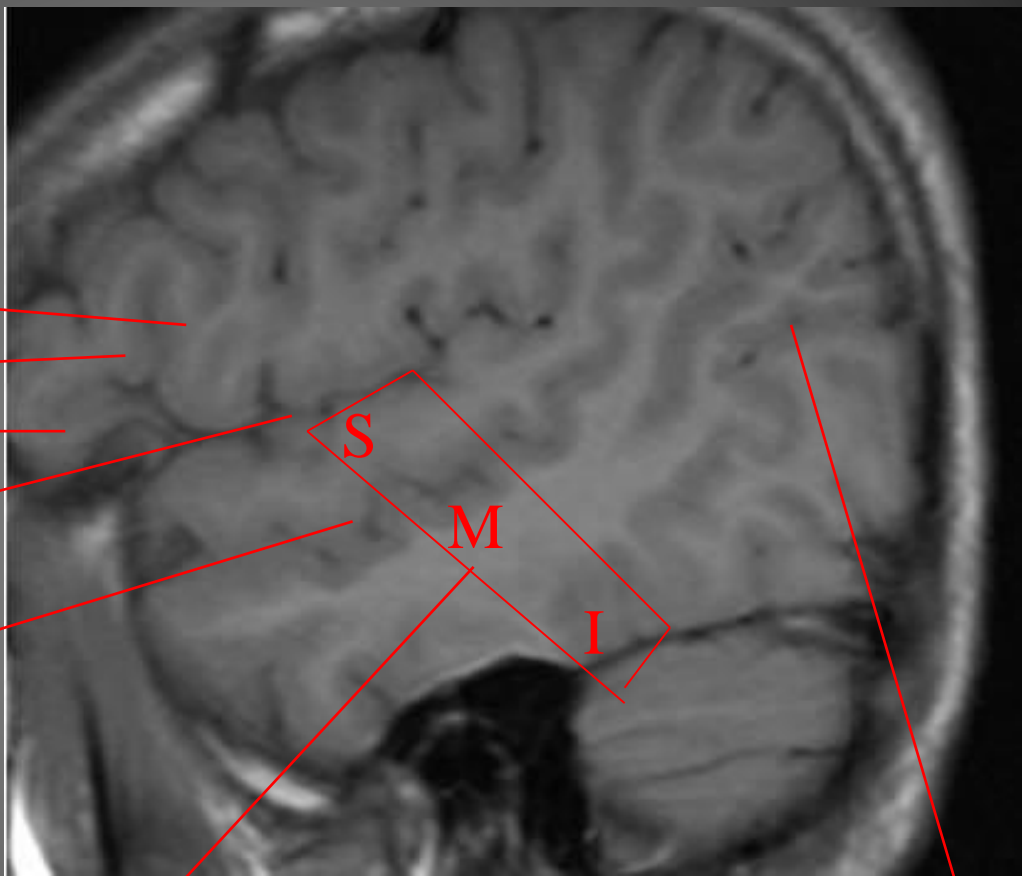


Old CT



Recent CT





Inferior frontal gyrus

Pars opercularis,
Pars triangularis,
Pars orbitalis.

Sylvian fissure

Superior temporal sulcus

transverse Temporal gyri

Parieto-occipital sulcus

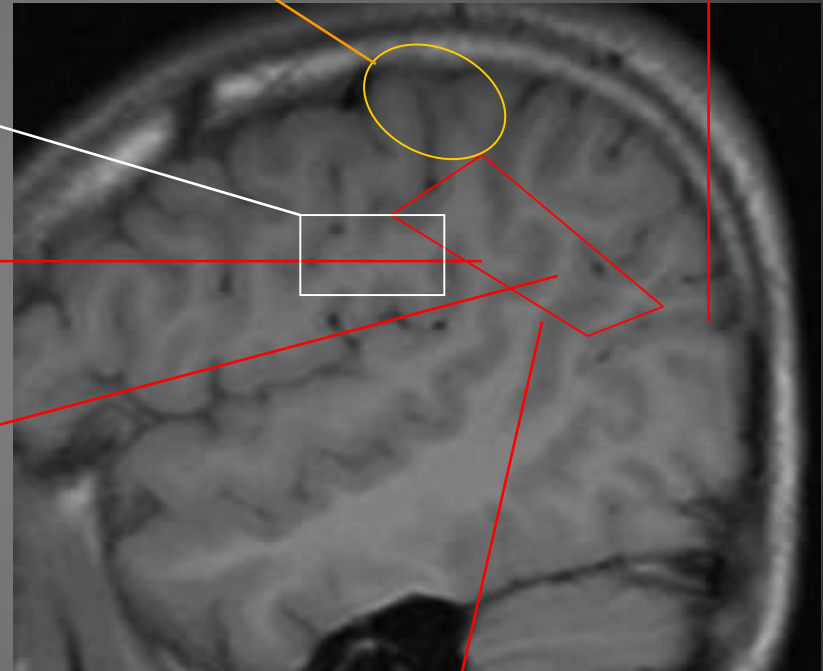
Paracentral lobule

Parieto occipital sulcus

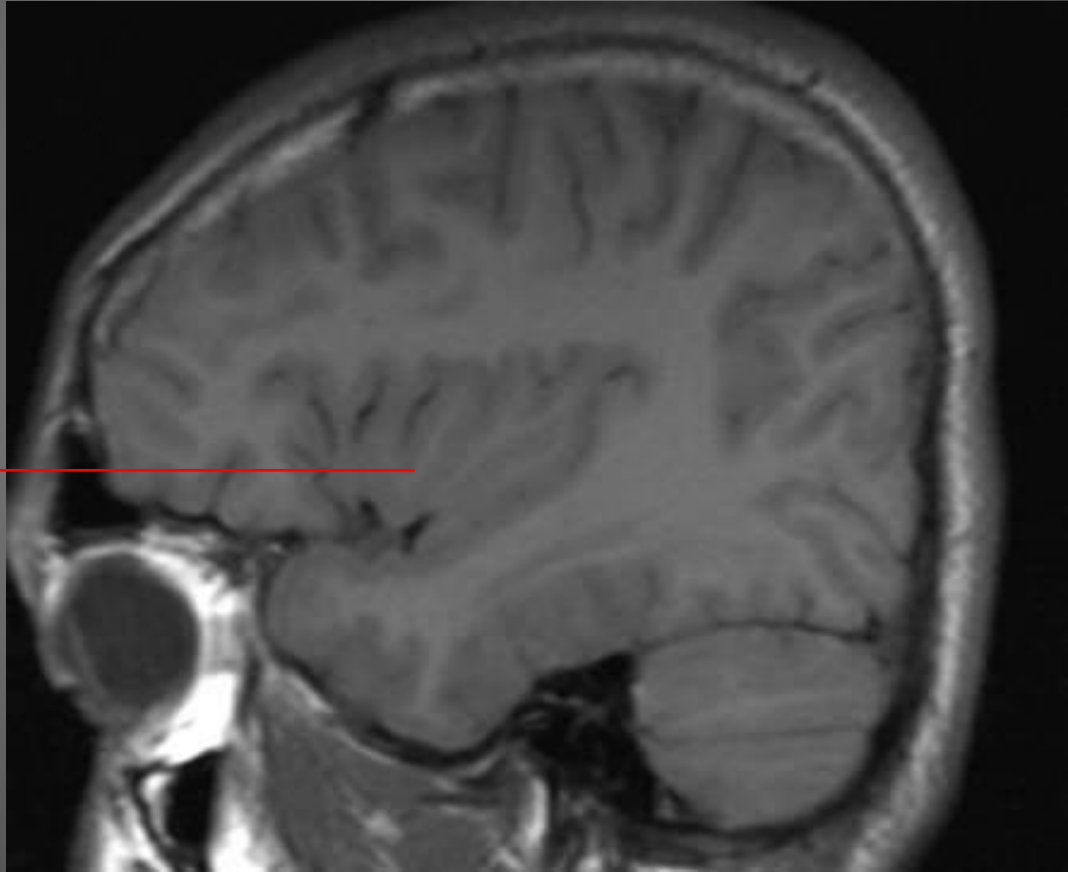
Subcentral
Lobule

Supramarginal gyrus

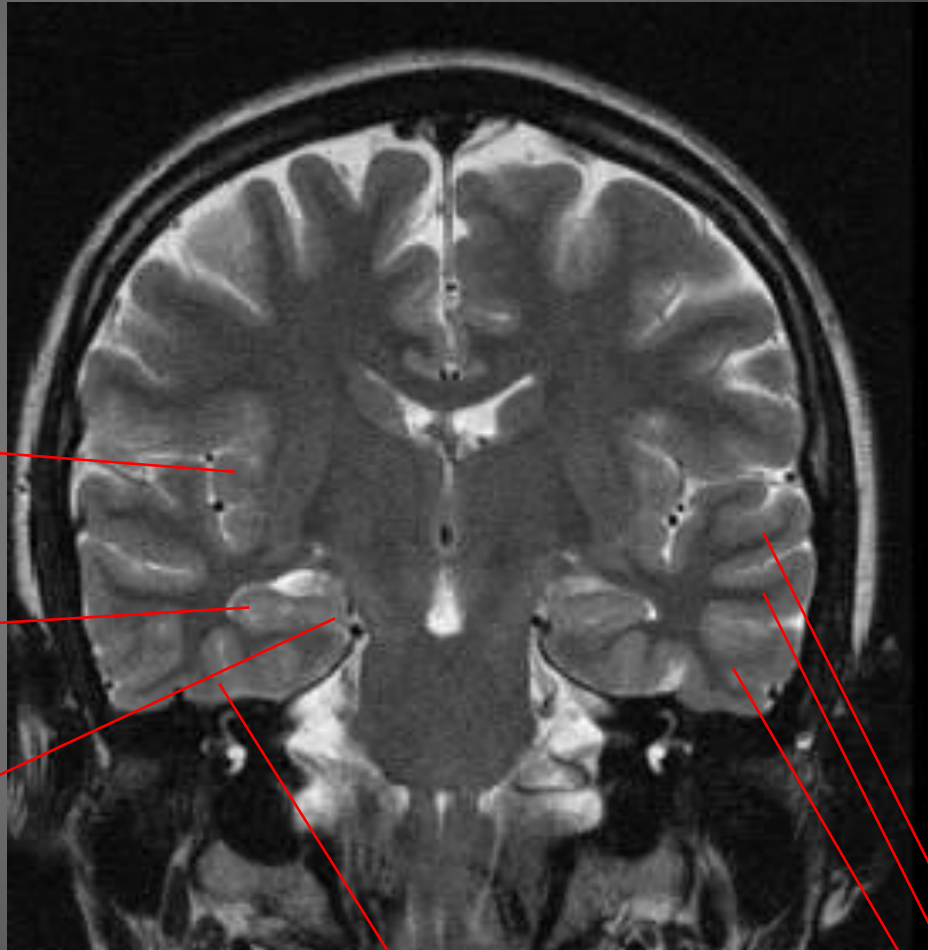
Angular gyrus



Inferior parietal lobule



Insular cortex



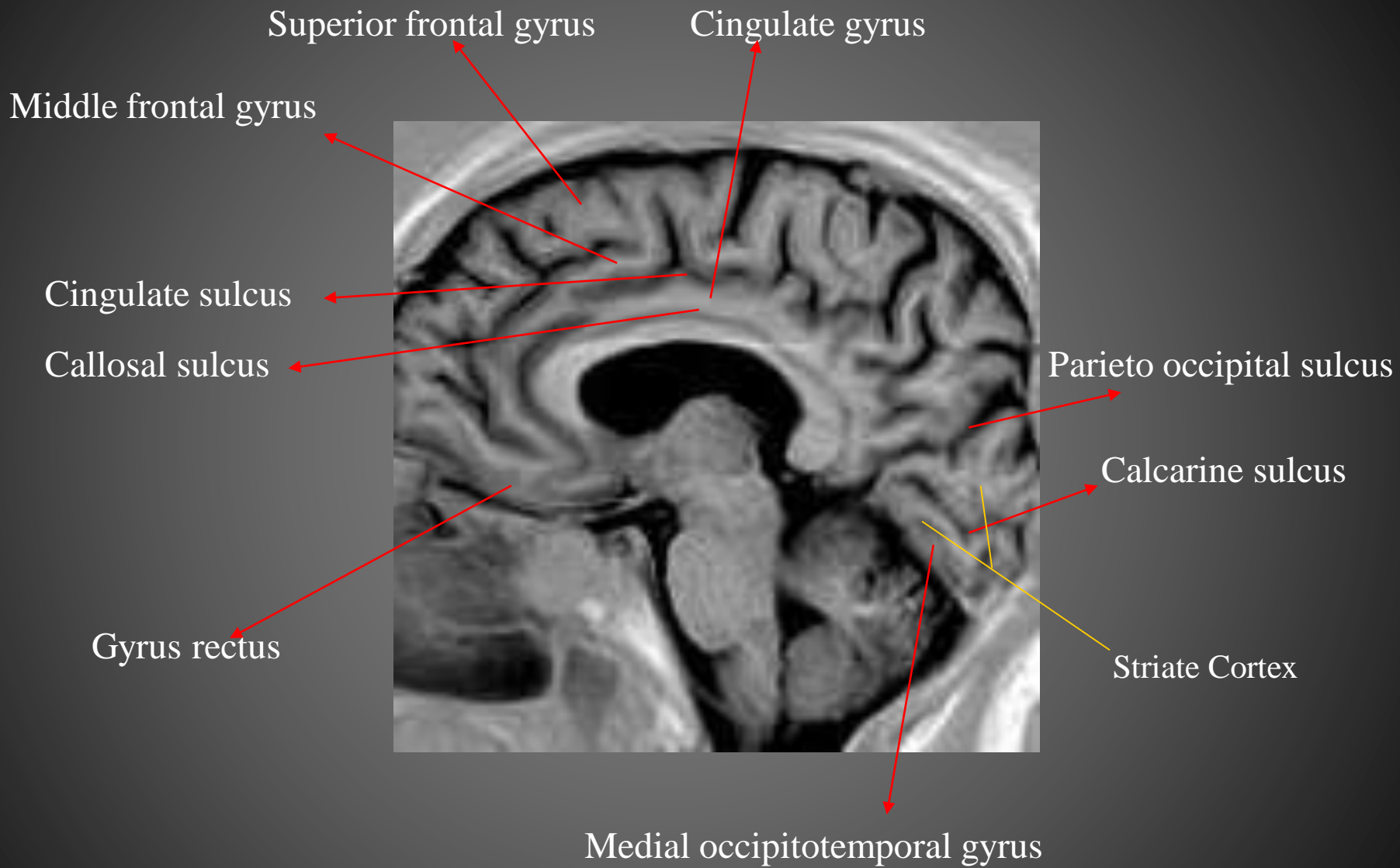
insula

Hippocampus

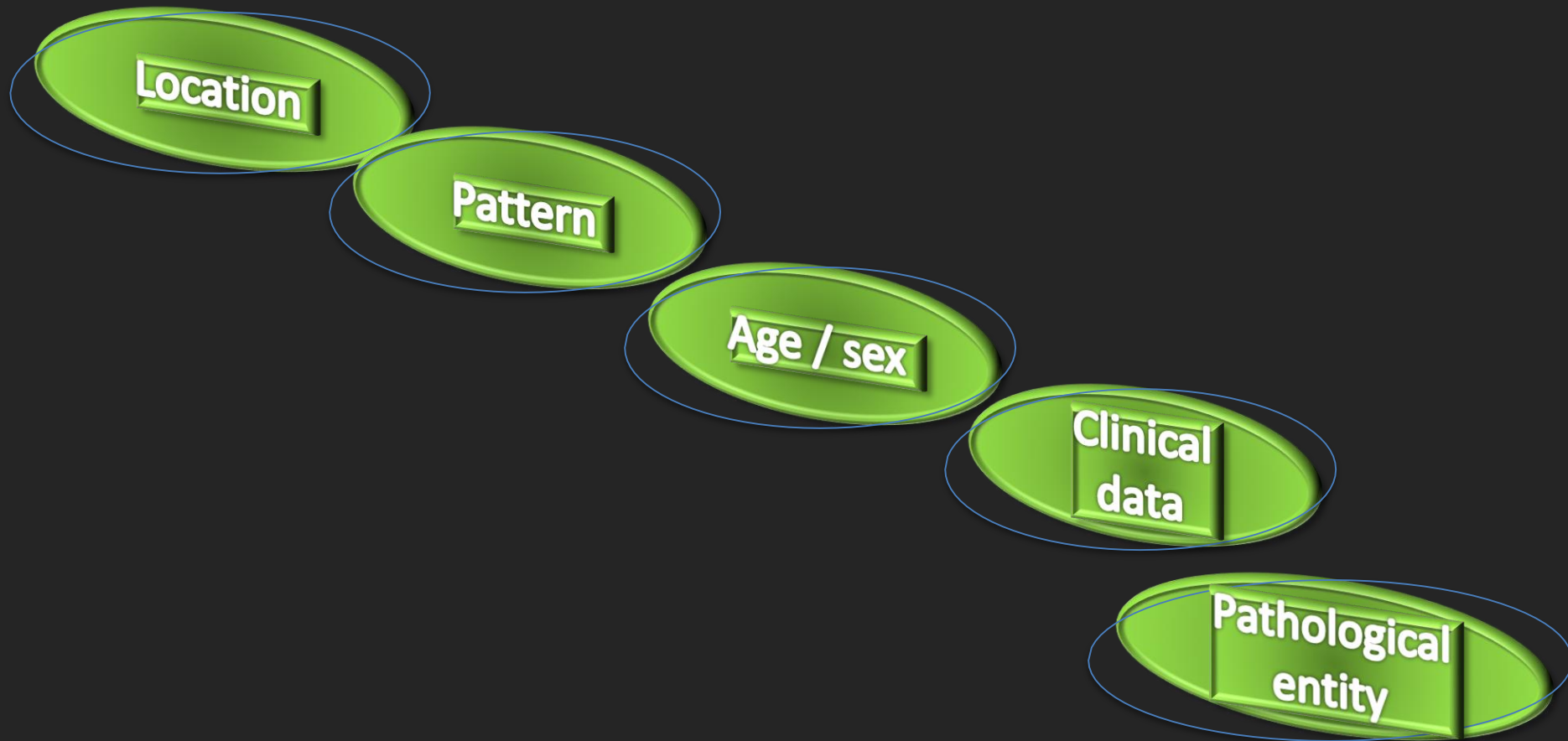
Parahippocampus

Lateral occipito-temporal gyrus

S;M;I,temporal gyri



Approach to brain mass



Localization

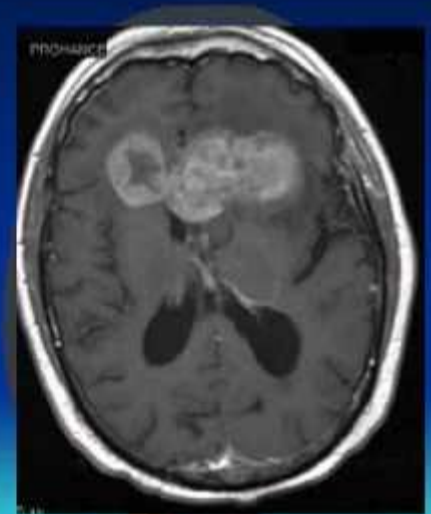
- Intra or extra axial tumor?
 - **Intra-axial** tumor = tumor locates **within** brain parenchyma
 - **Extra-axial** tumor = tumor locates **outside** the brain parenchyma, such as Skull, CSF cisterns and ventricles.



PATTERN ANALYSIS: Location

Basic Approach

- Where is the lesion ?
 - Extraaxial
 - **Intraaxial**
 - Intraventricular
- Where is the lesion ?
 - Supratentorial
 - Infratentorial
- How old is the patient ?
 - Child
 - Adult
- What about Sex?



PATTERN ANALYSIS: Location

Basic Approach

– Where is the lesion ?

- Extraaxial

- **Intraaxial**

- Intraventricular

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- Child

- Adult

– What about Sex?



PATTERN ANALYSIS: Location

Basic Approach

– Where is the lesion ?

- Extraaxial

- **Intraaxial**

- Intraventricular

– Where is the lesion ?

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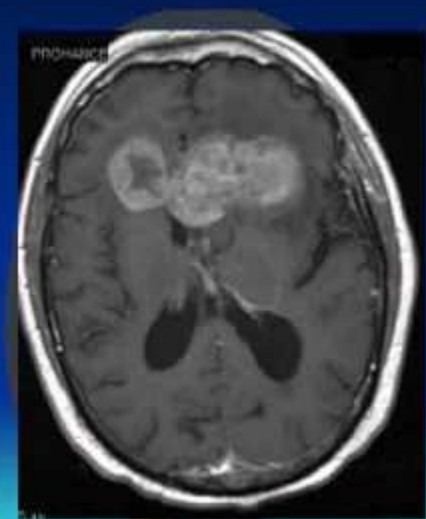
- Infratentorial

– How old is the patient ?

- Child

- Adult

– What about Sex?



Sign of extra-axial location

Definitive sign

- **CSF** cleft between brain and lesion
- **Vessels** interposed between brain and lesion
- **Cortex** between brain and lesion
- **Dura** (Meninges) between brain and lesion

Suggestive sign

- Peripheral, broadly base along calvarium
- Overlying bone change
- Enhancement of adjacent meninges
- Displacement of brain from the skull



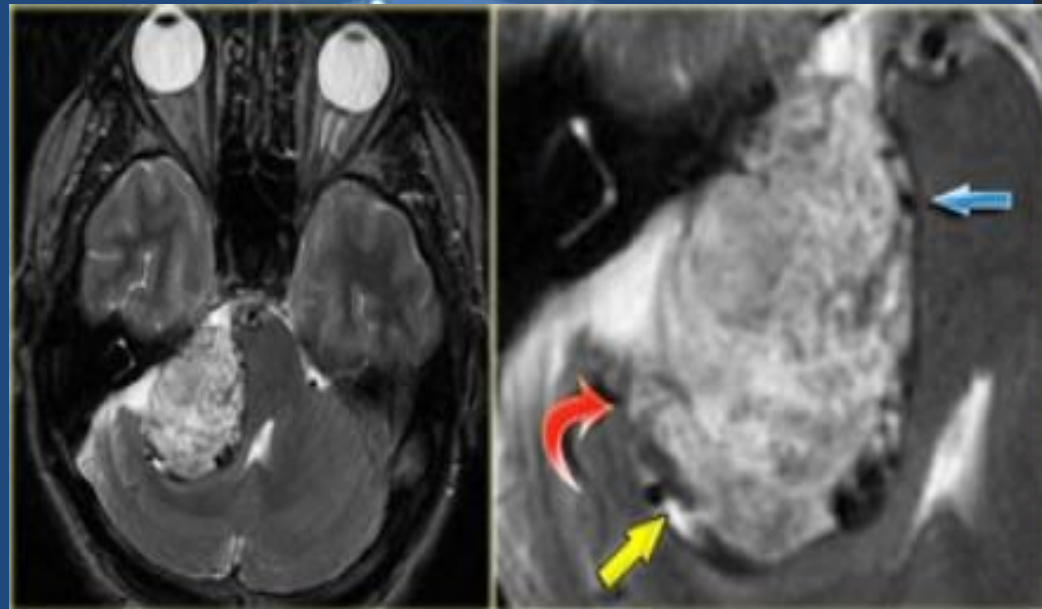
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Definitive sign

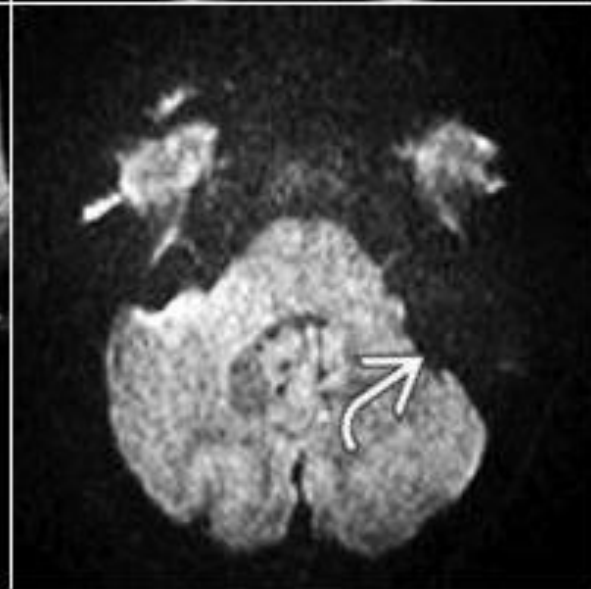
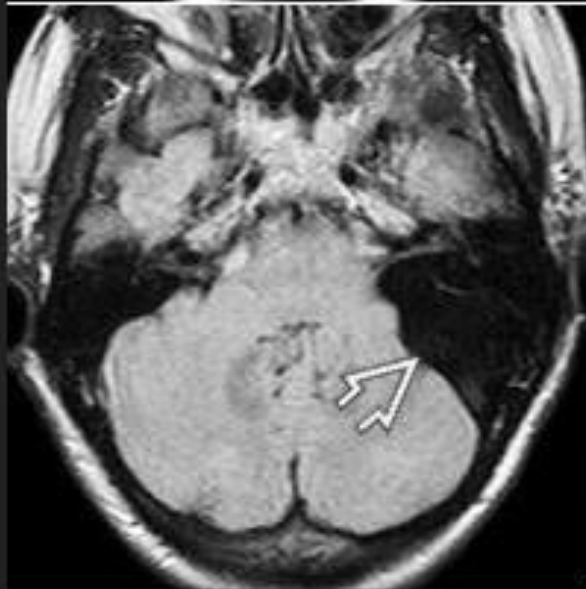
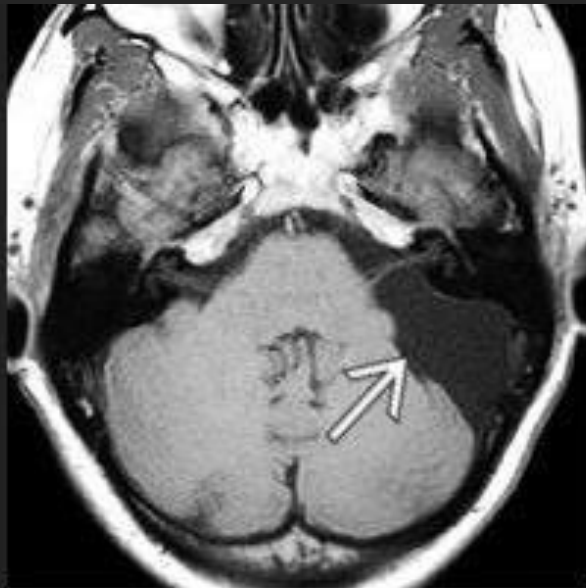
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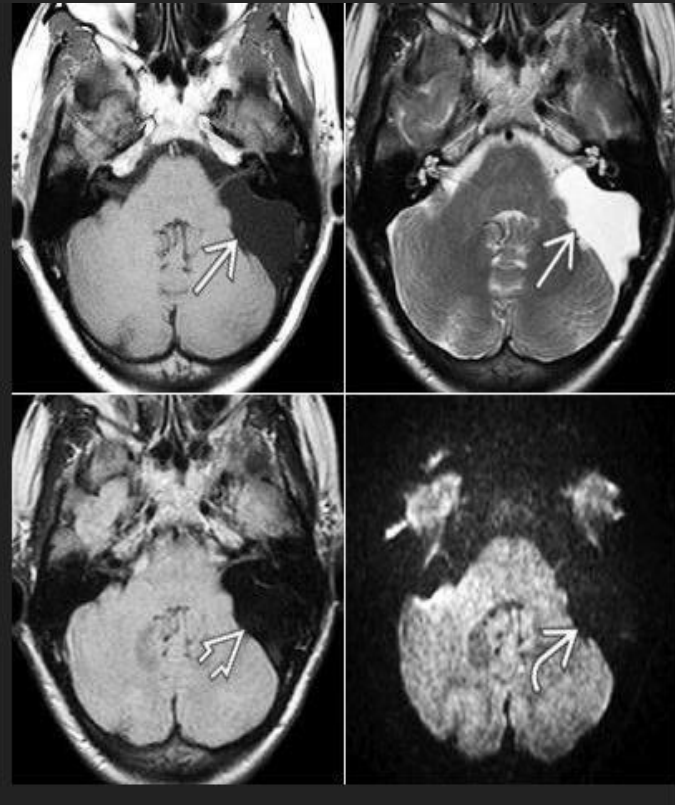
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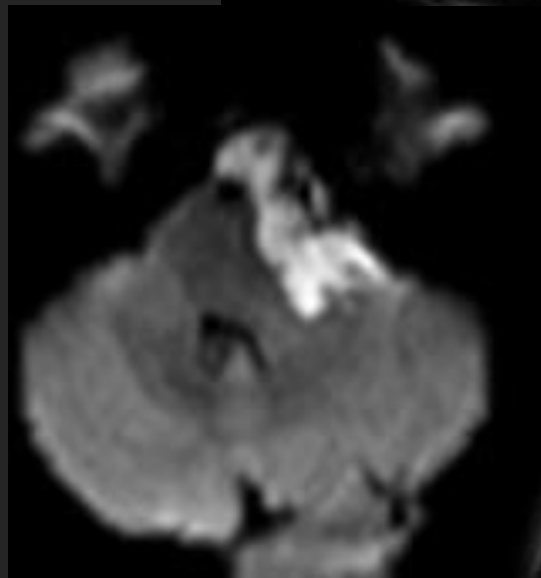
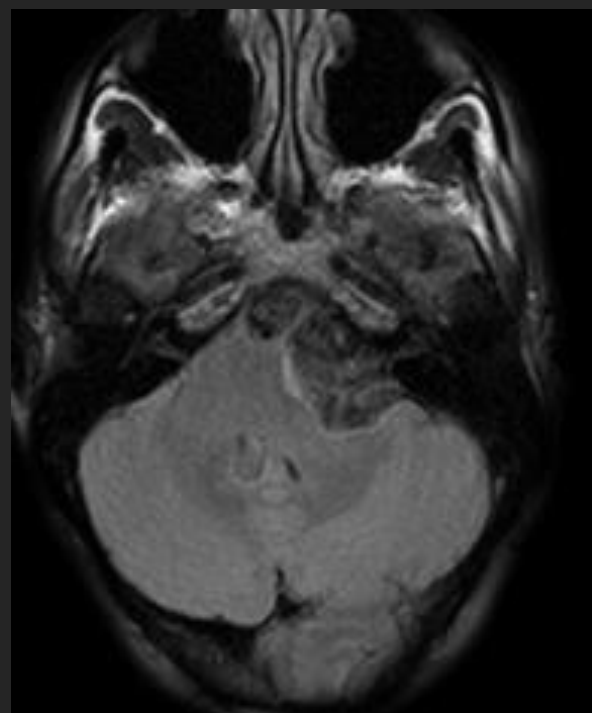
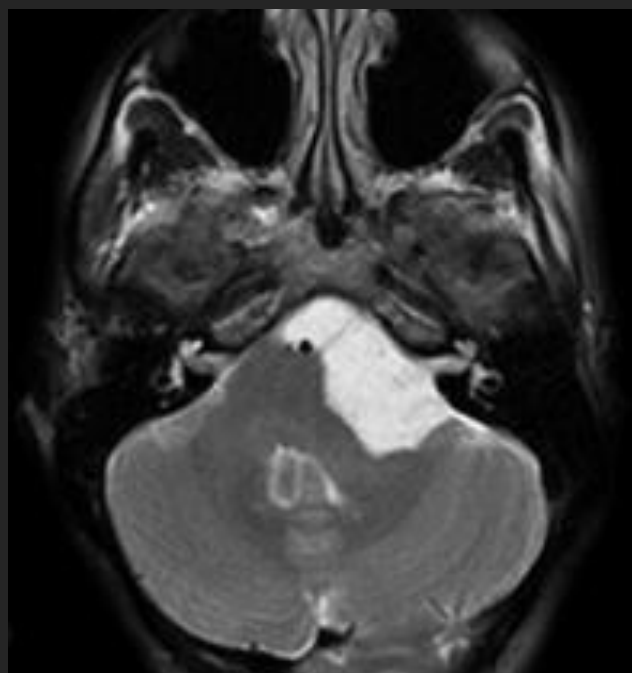


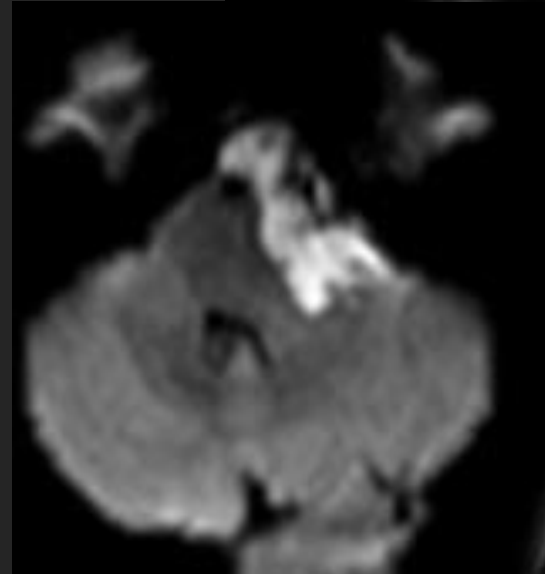
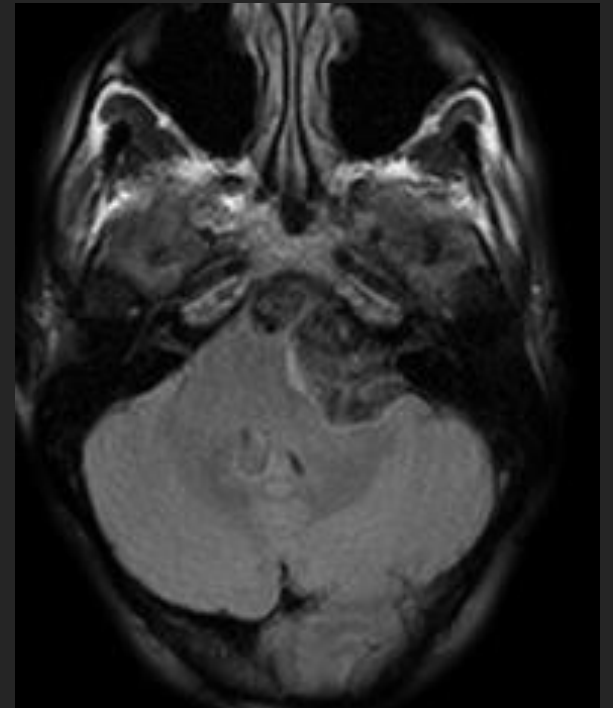
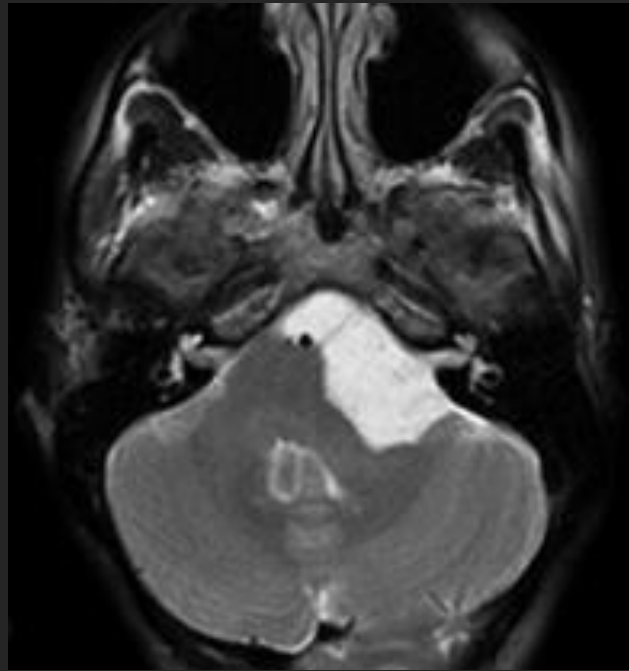






Arachnoid cyst low on T1WI AND
HIGH ON T2WI , WITHOUT
restriction on DWI





Epidermoid

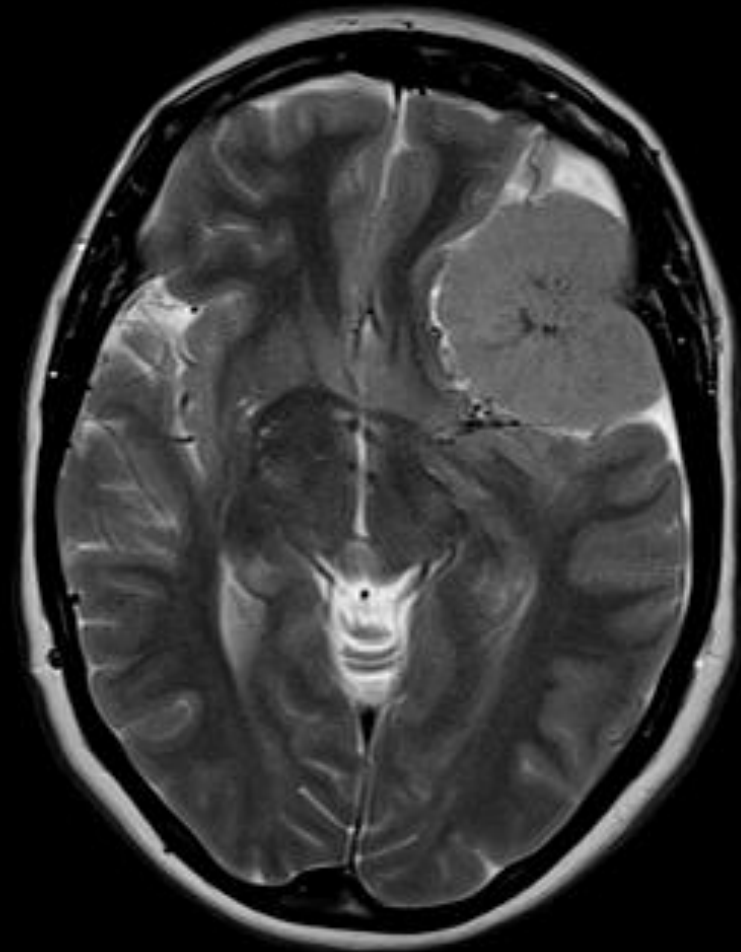
Epidermoid

- HIGH ON T2WI , WITH restriction on DWI

Meningioma

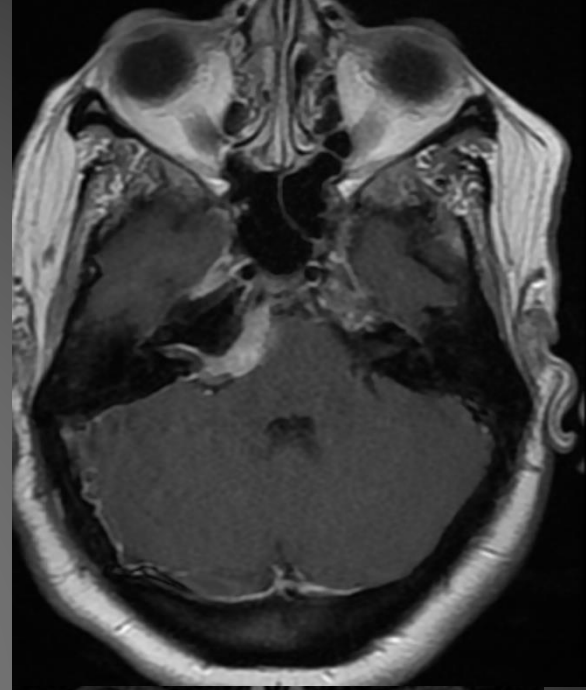
- Extraaxial brain tumor (outside of the brain) displacing The brain)
Enhances with gadolinium
Has a dural tail

Warning: Not for diagnostic use



Meningioma

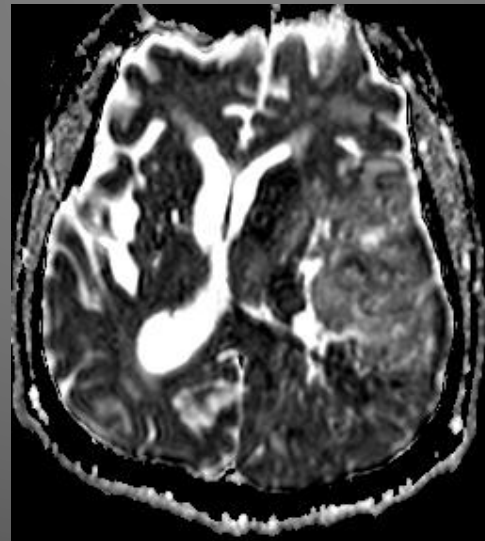
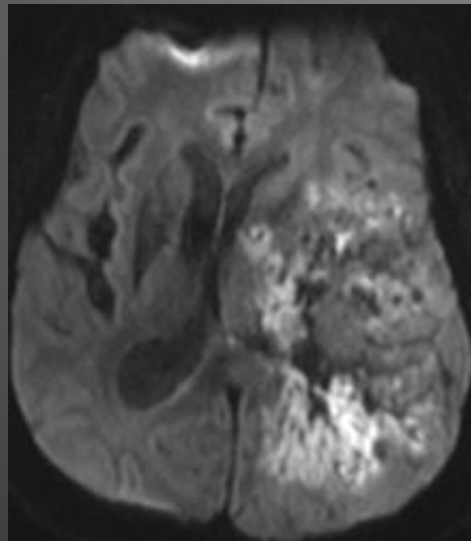
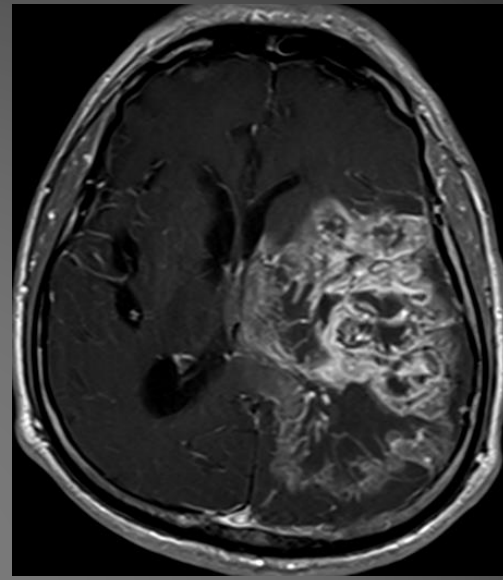
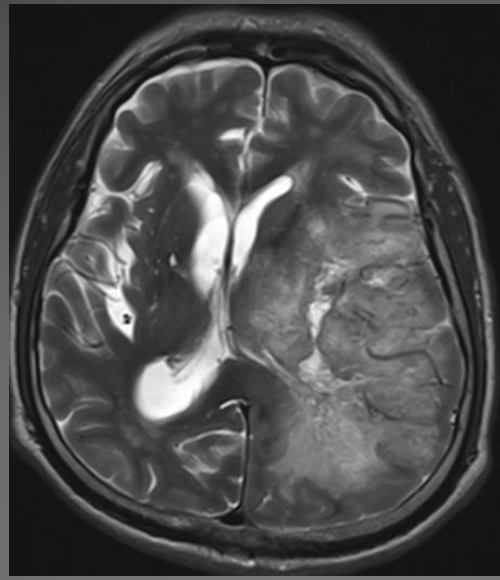
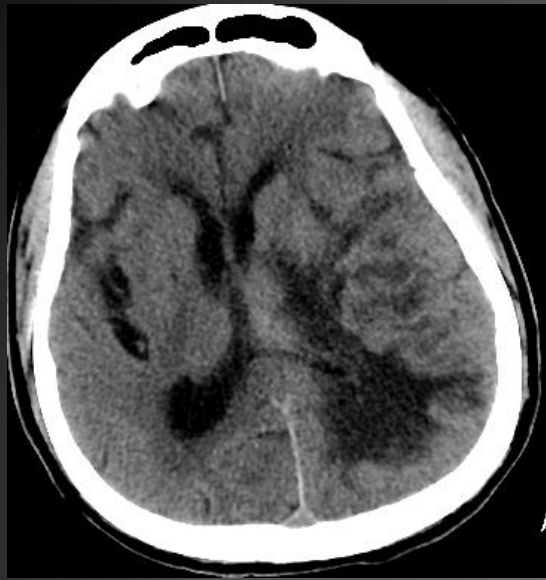
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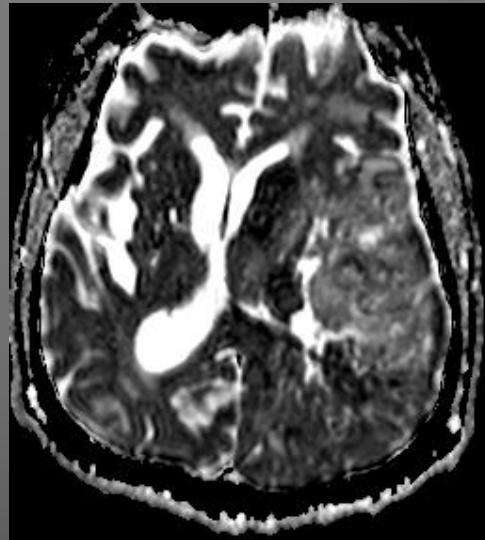
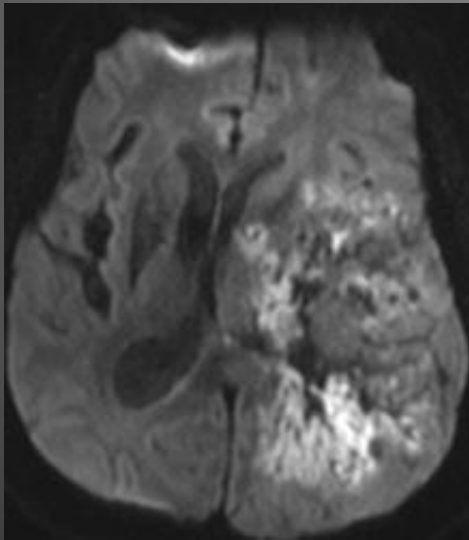
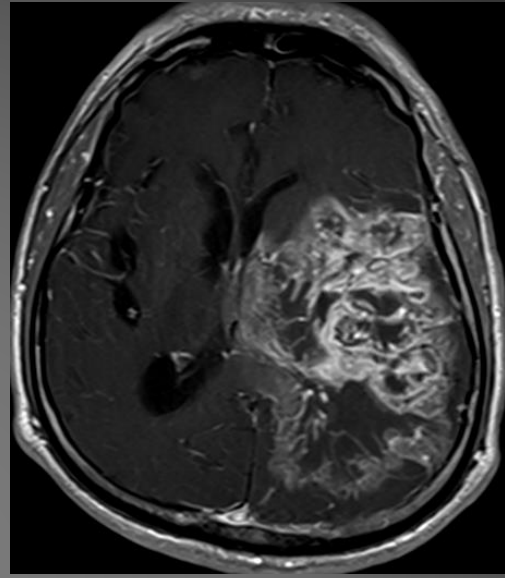
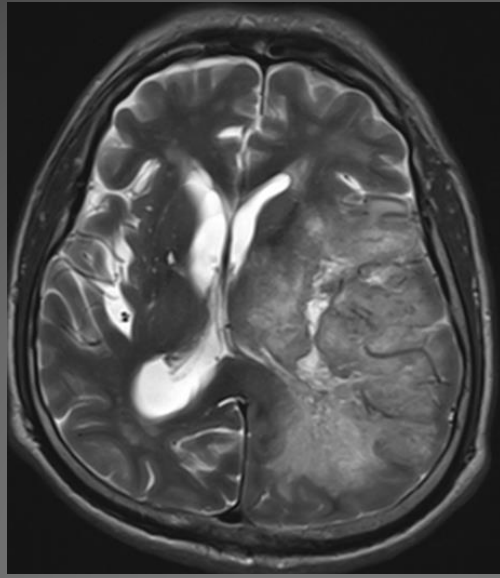
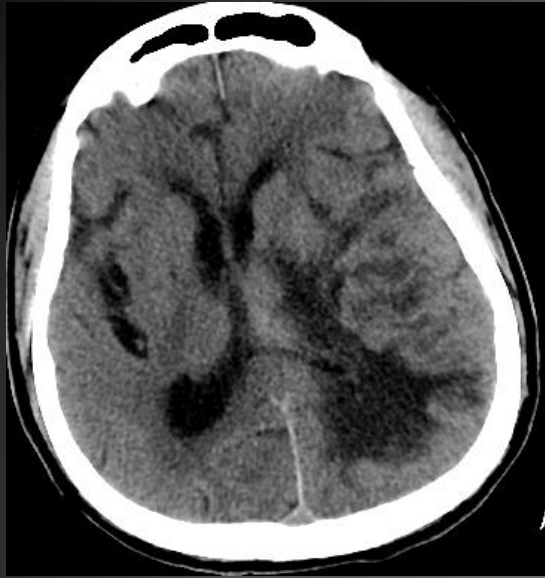


Glioblastoma Multiforme

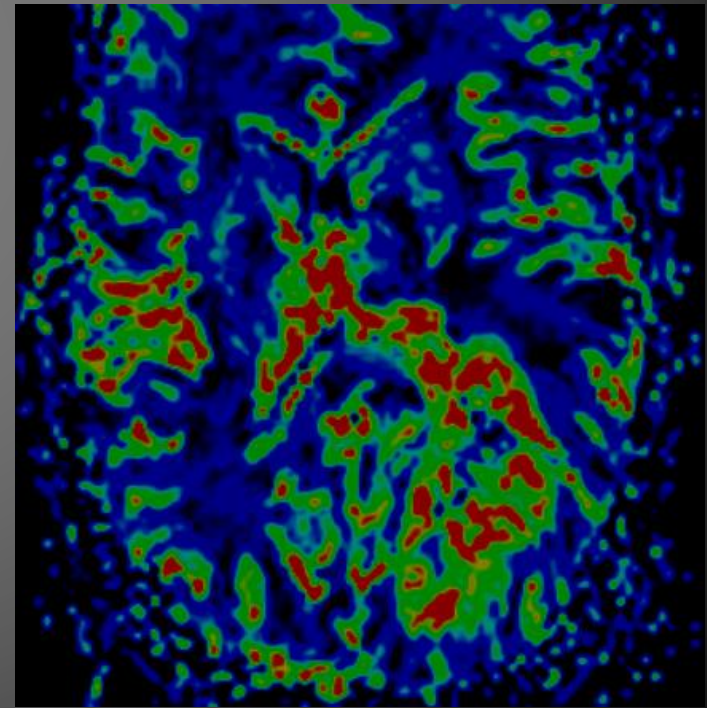
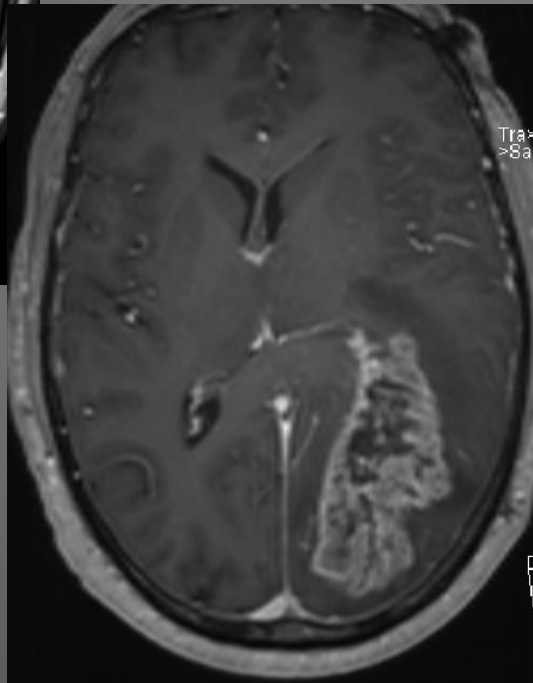
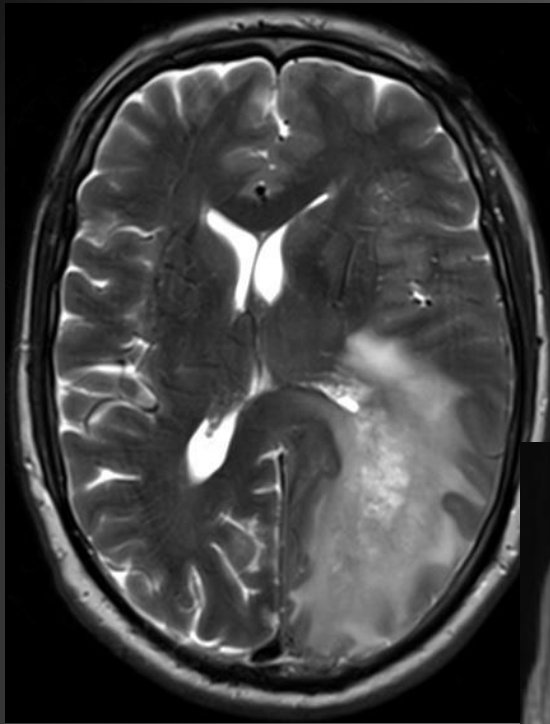
GBM

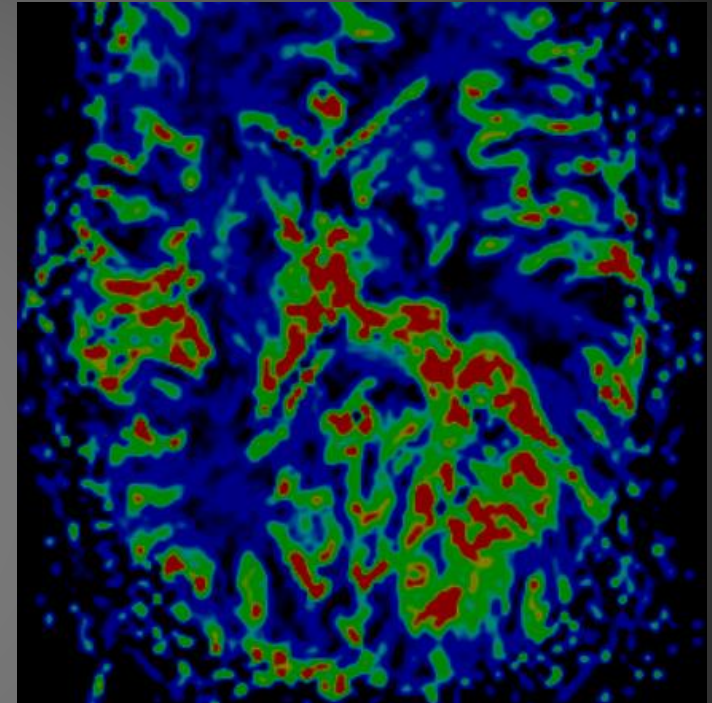
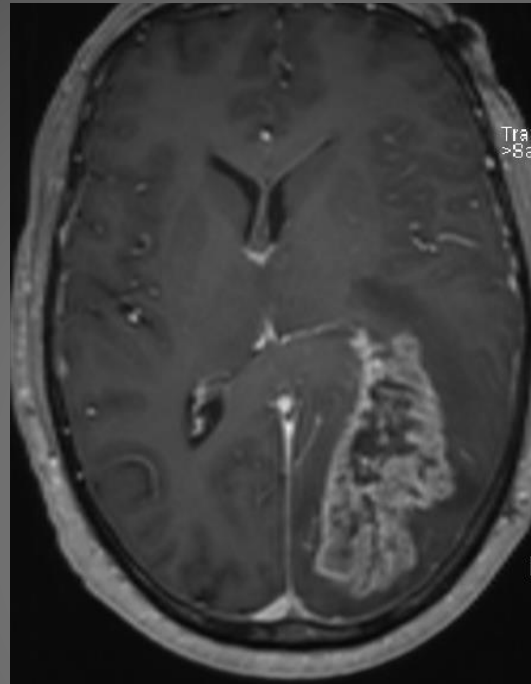
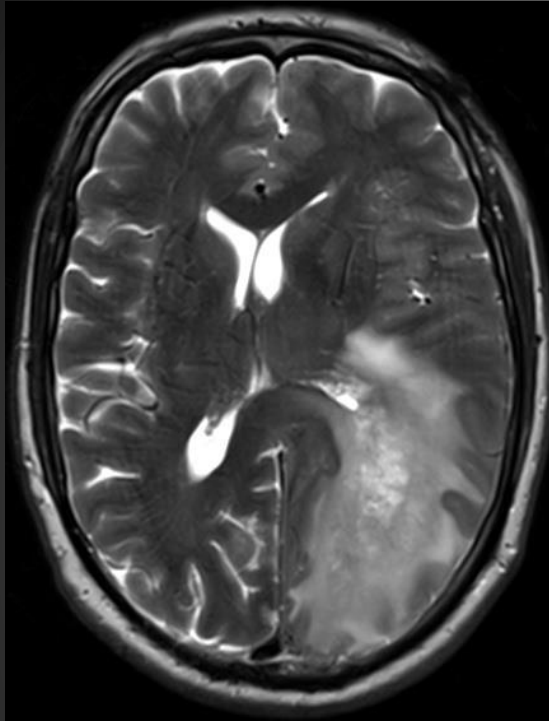
- WHO grade IV
- Most common 1ry brain tumor and most malignant
- Can occur at any age even
- neonates and infants
- Cerebral hemisphere (subcortical,
- periventricular and across compact tract. Basal ganglia and thalamus.





GBM



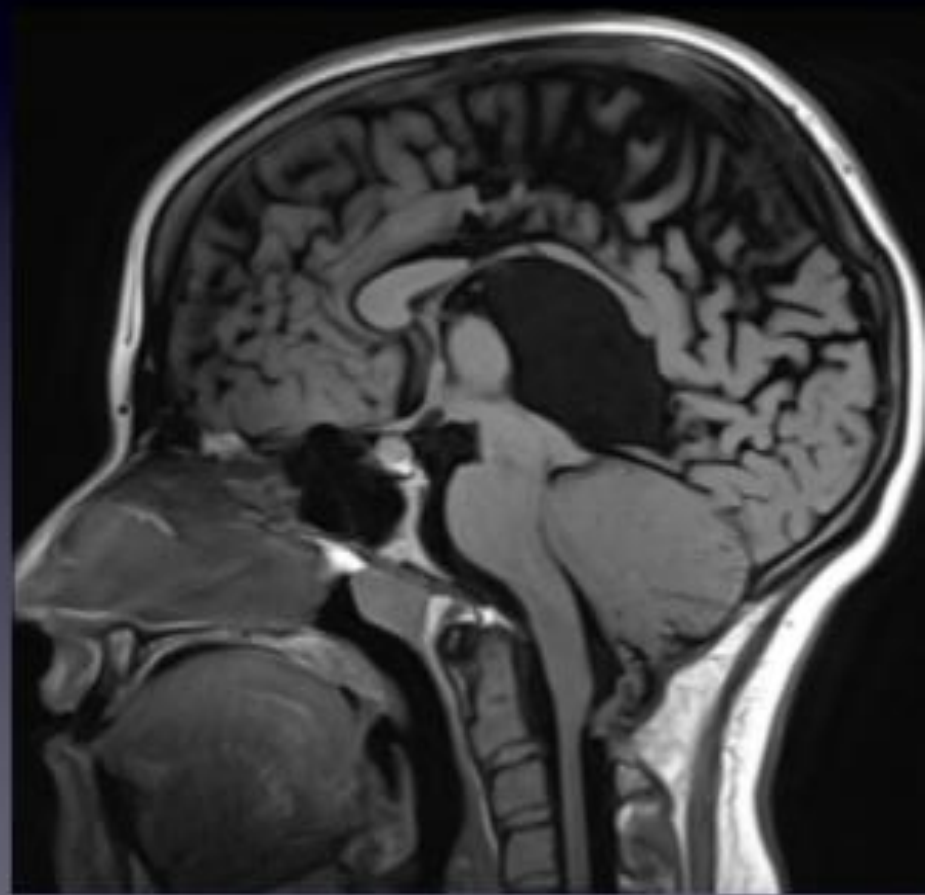
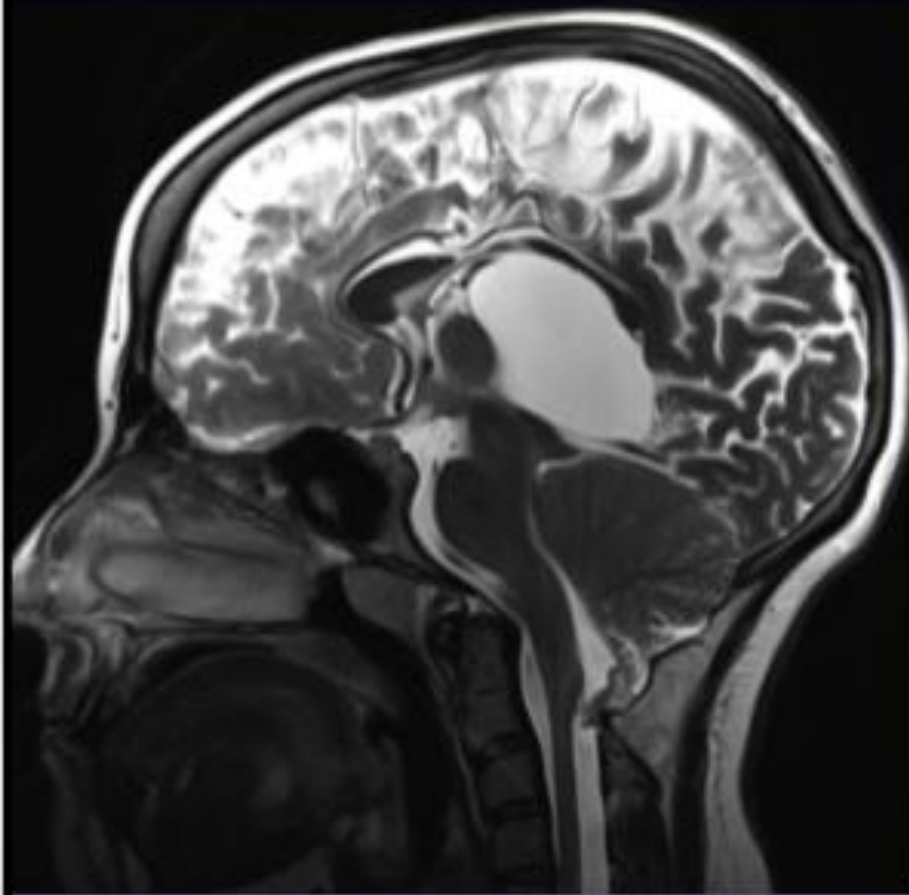


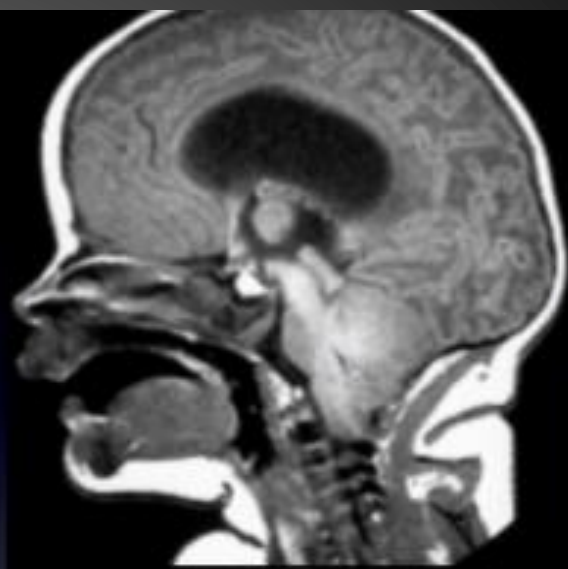
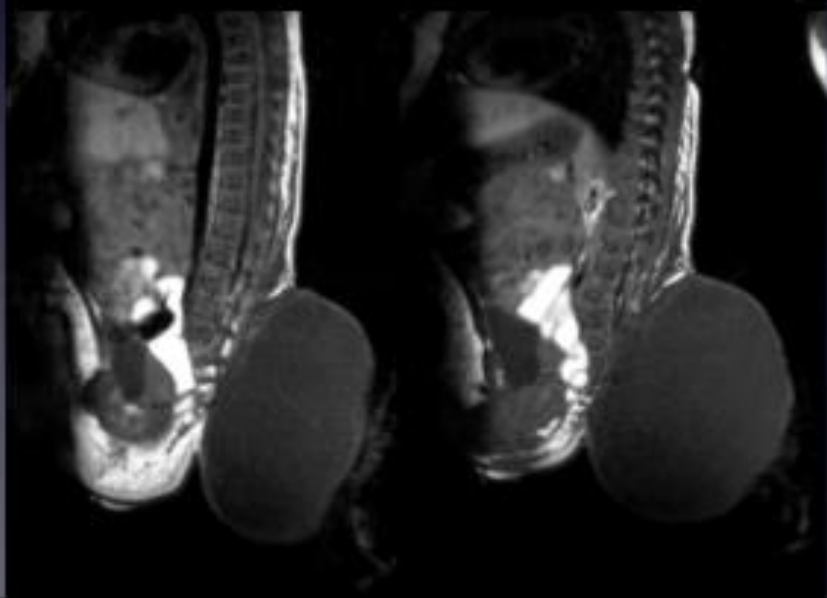
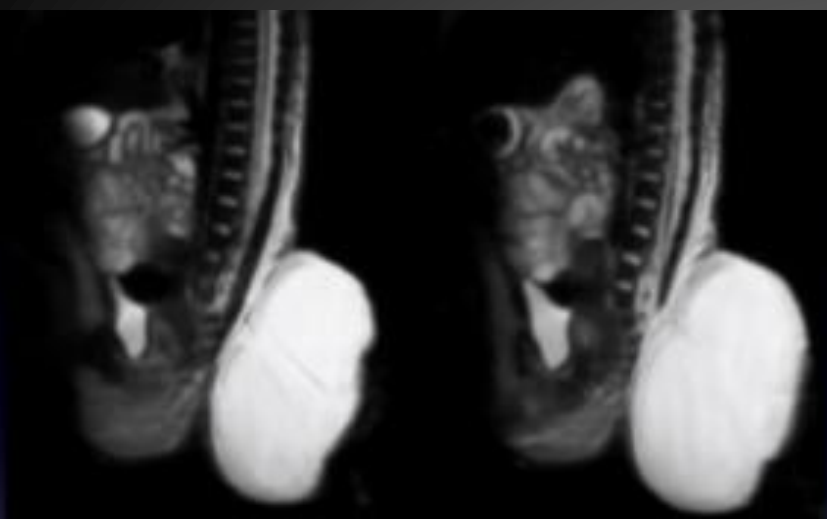
Linear nodular central areas of enhancement with thicker peripheral enhancement

Very high rCBV values on perfusion MRI in enhancing part with intermediate perfusion values in immediate surrounding non-enhancing areas indicating tumor infiltration

Also look for diffusion restricted areas corresponding to enhancement

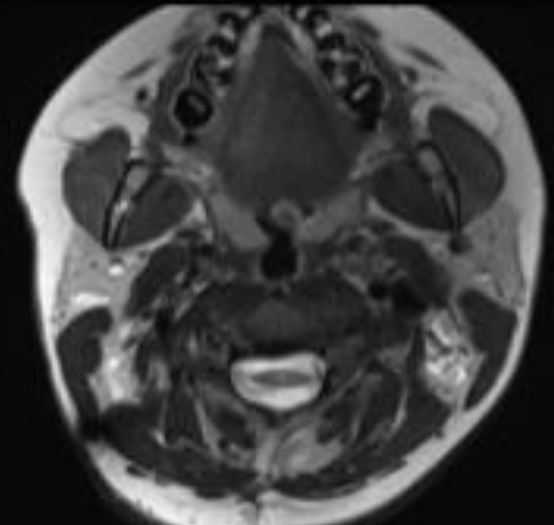
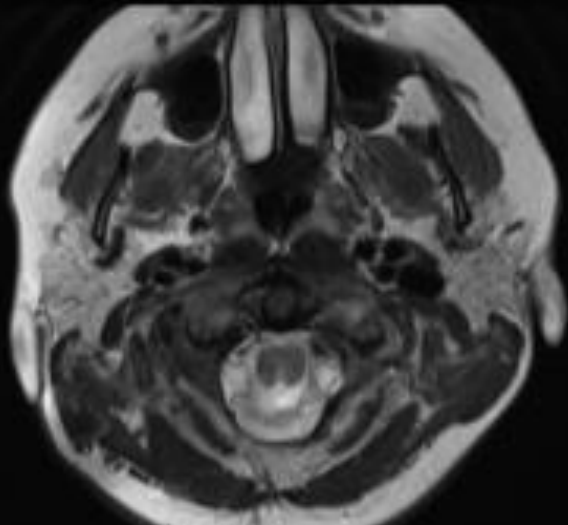
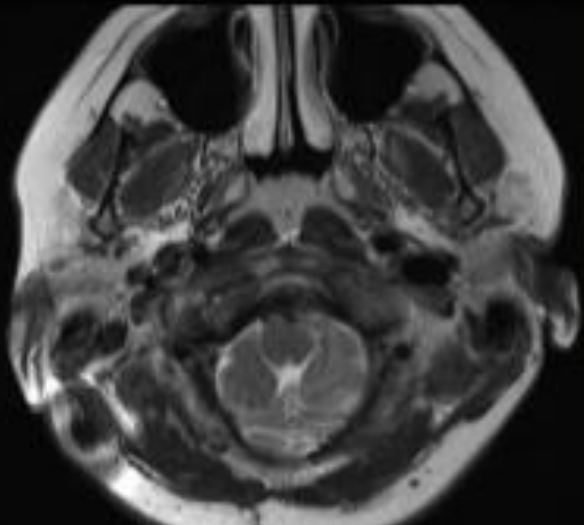
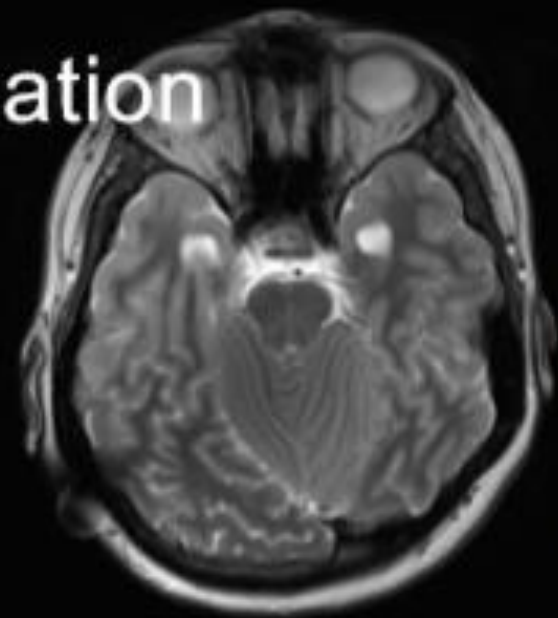
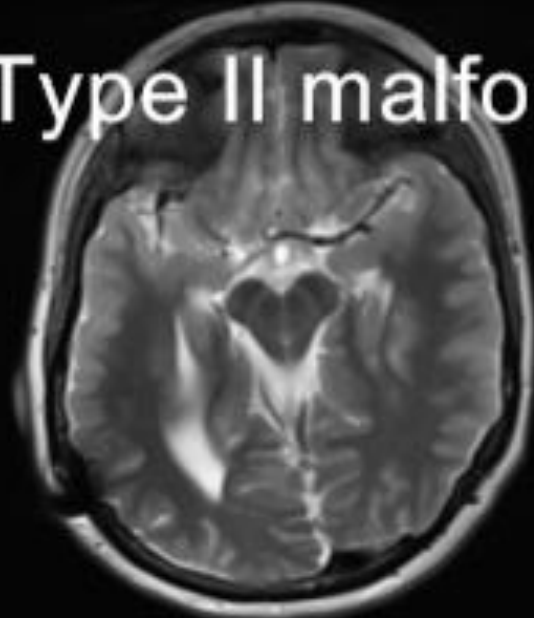
Chiari Type II malformation

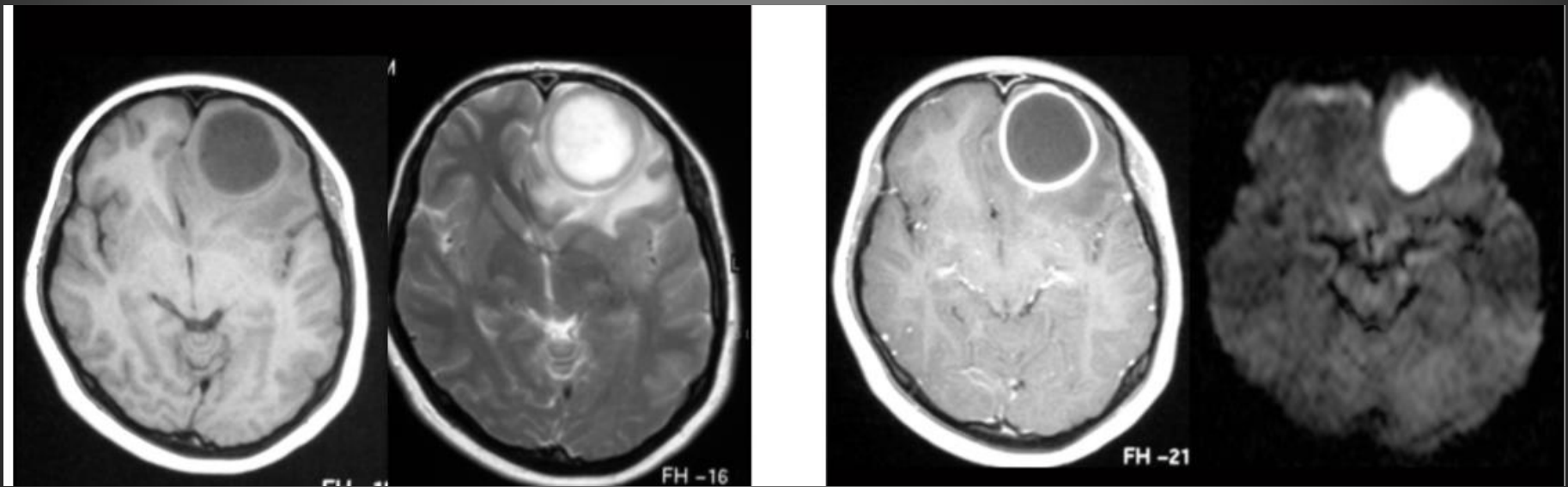




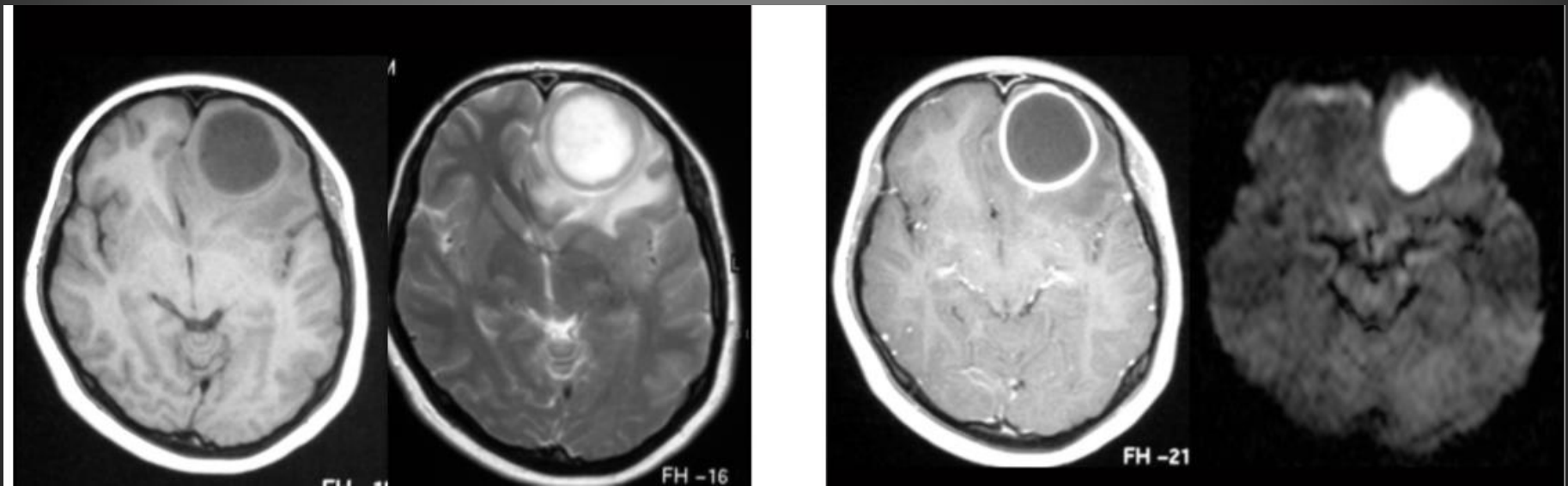


Chiari Type II malformation





Brain abscess



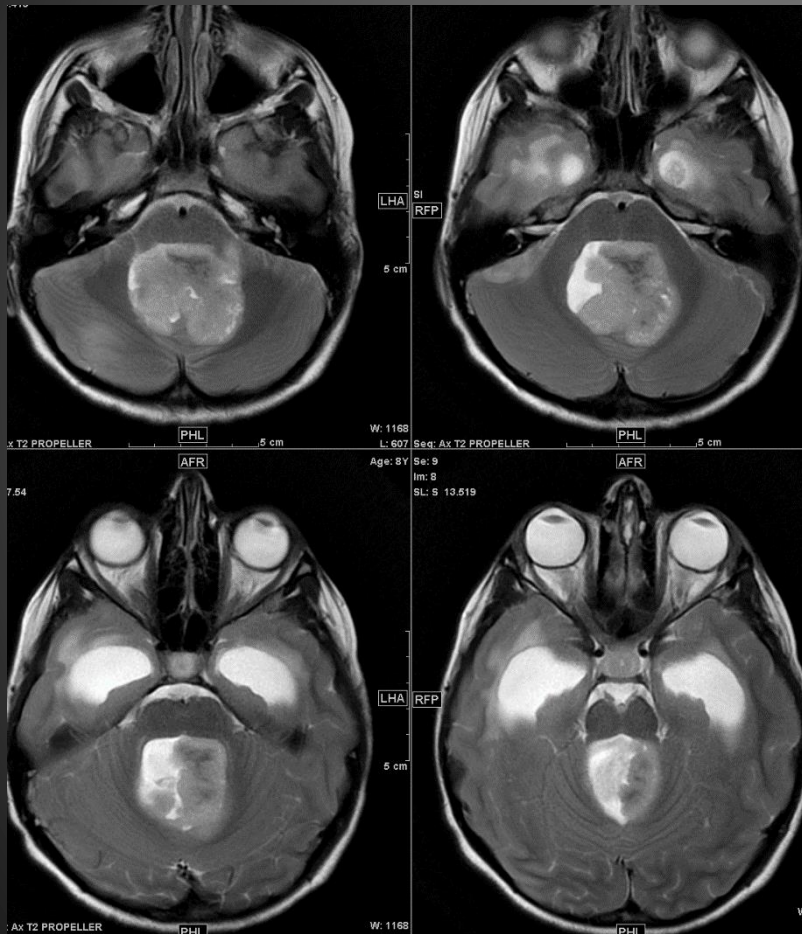
Abscess : CT and MRI findings

« Capsule is thin-regular and shows an uniform enhancement »

The rim is:

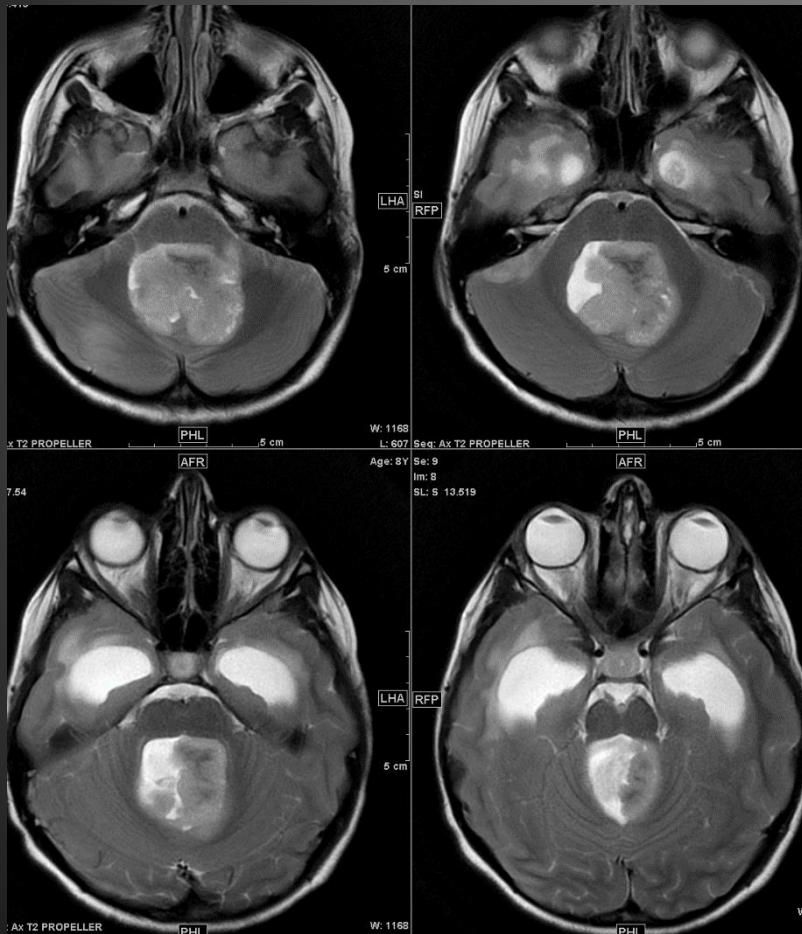
- Hypersignal on T1Wi
- Hyposignal on T2Wi
- Abscess and Neonates: Large size, thin capsule, typically in the periventricular white matter.

Medulloblastoma

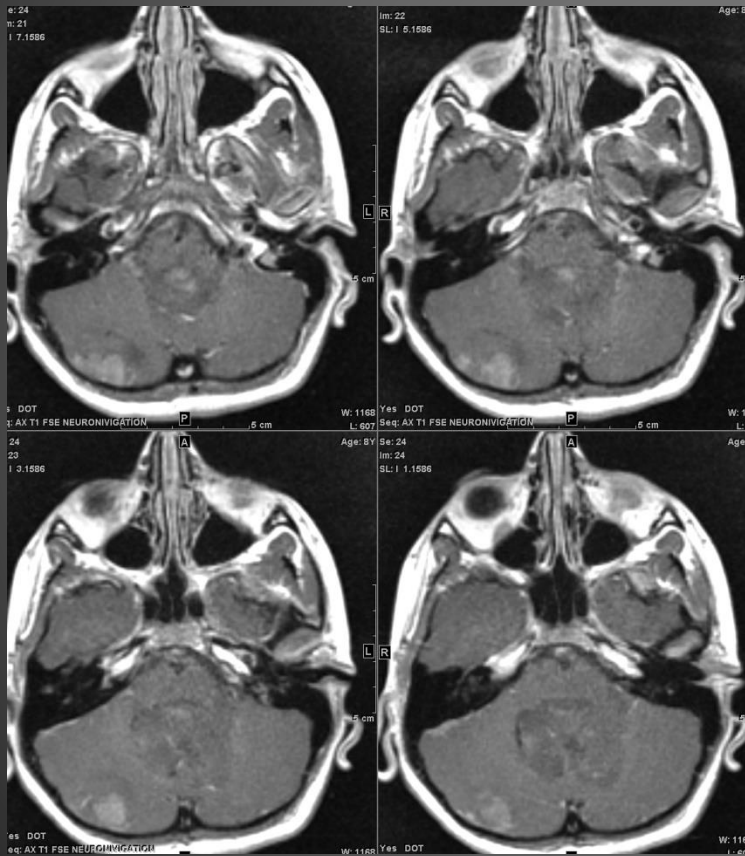


- **Medulloblastomas** are the most common malignant brain tumor of childhood. They most commonly present as midline masses in the roof of the 4th ventricle with associated mass effect and *hydrocephalus*.

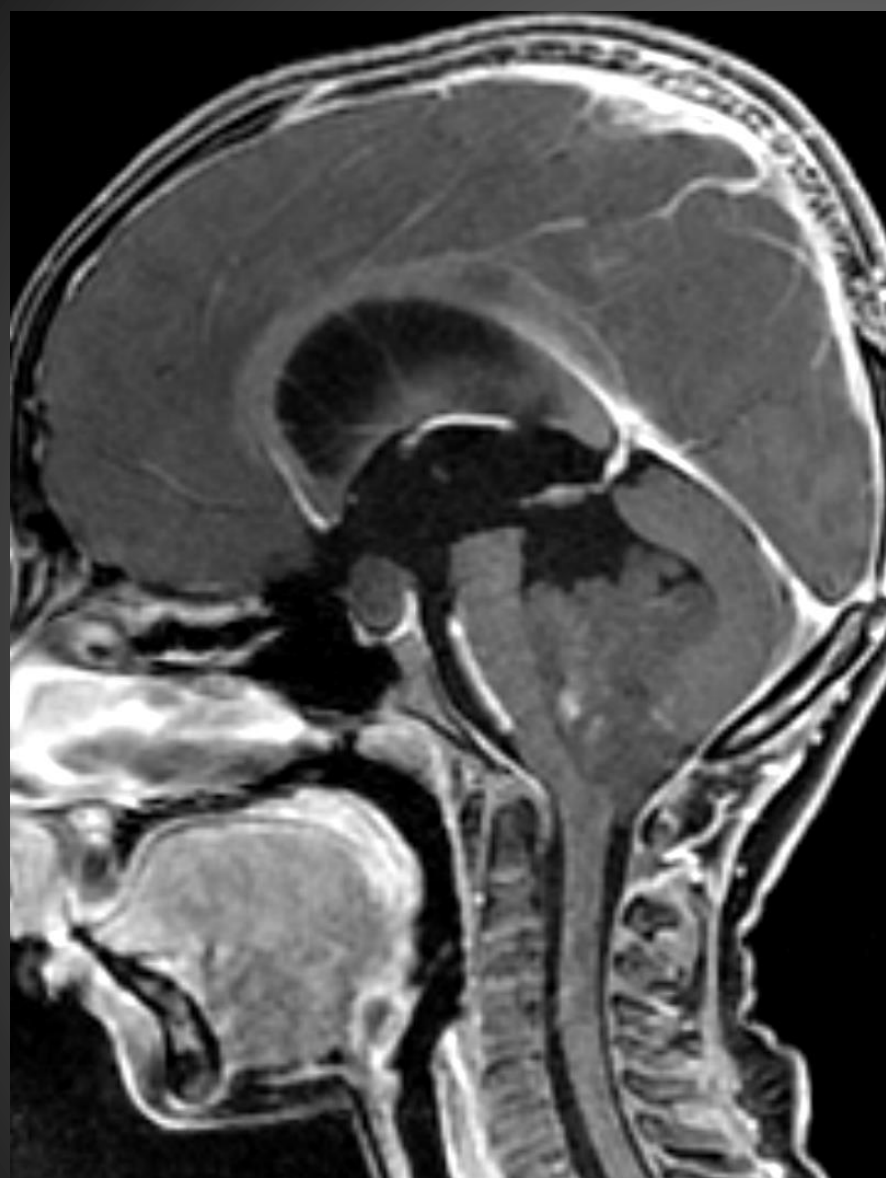
Medulloblastoma

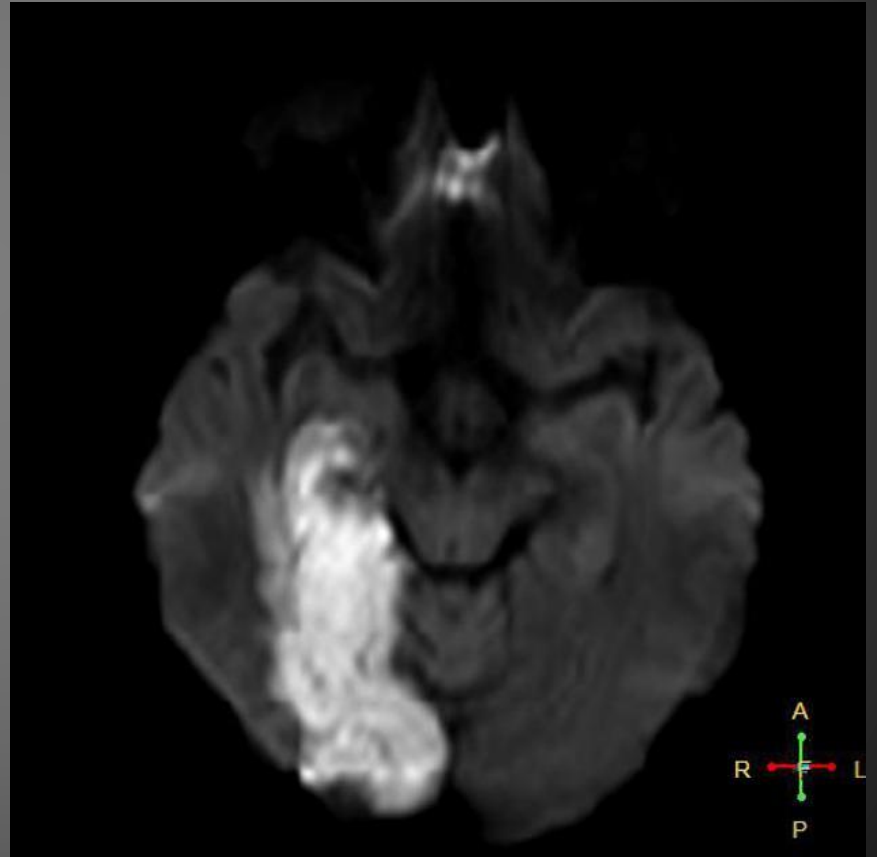
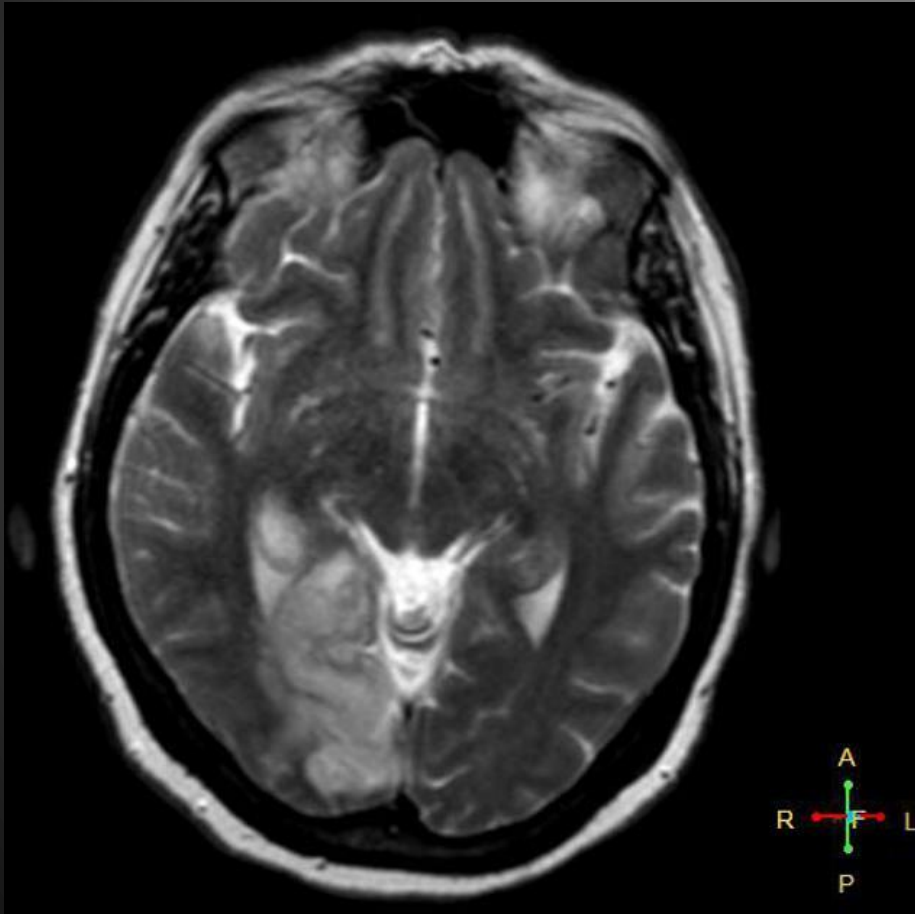


- **Medulloblastomas**
- *On CT, medulloblastomas often appear as a mass arising from the vermis, resulting in effacement of the fourth ventricle / basal cisterns and obstructive hydrocephalus. They can also occur more laterally in the cerebellum.*



- Treatment typically consists of surgical resection, radiation therapy, and chemotherapy. In general, the tumors are quite radiosensitive.



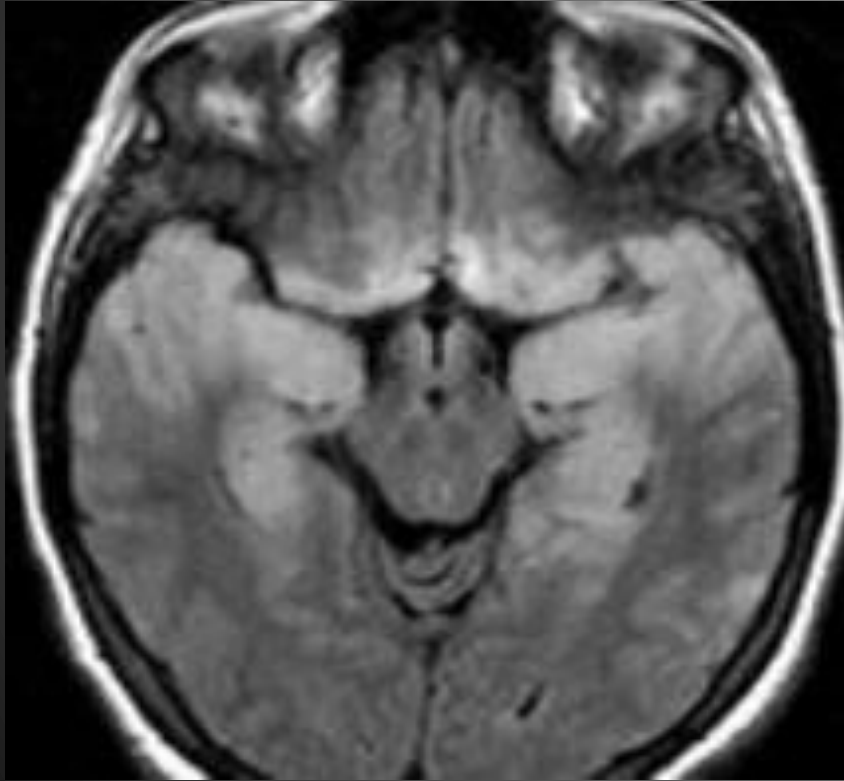


- **Acute PCA territory cerebral infarction**

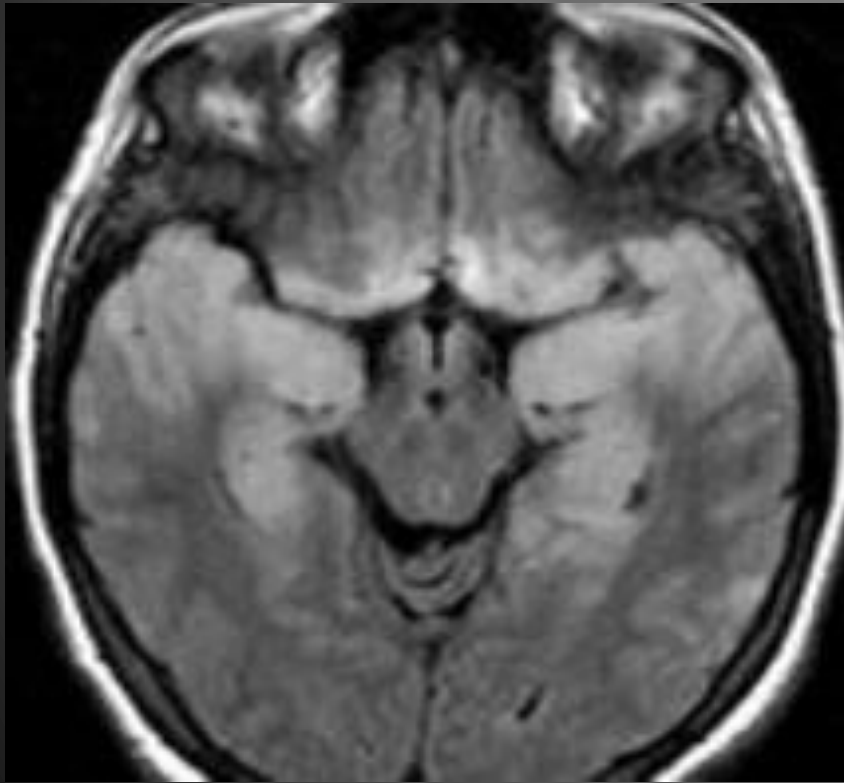


- Right occipital gyral swelling and altered signal in cortical and subcortical area exhibiting restricted diffusion in DWI, bright signal in T2.
- MRA reveals occluded P1 segment of right PCA.
- **Diagnosis: Right PCA territory acute cerebral infarction.**

**The abnormalities on this MRI are
due to:**

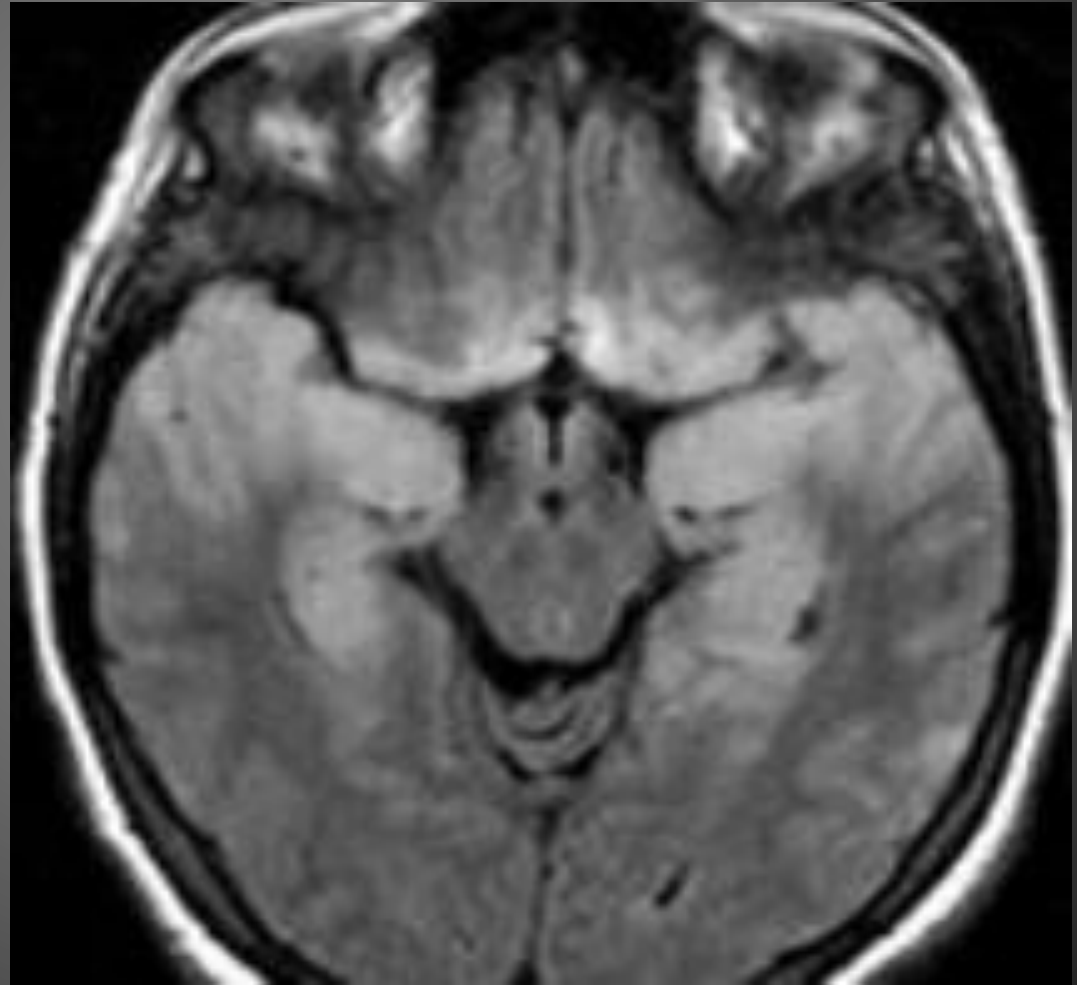


The abnormalities on this MRI are due to:



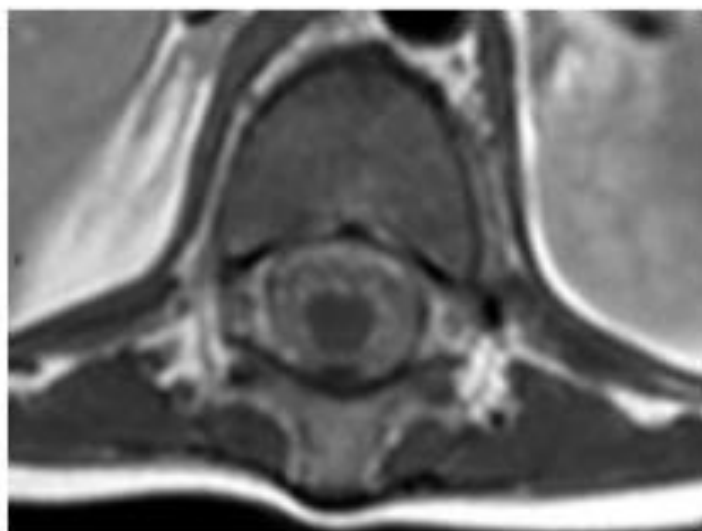
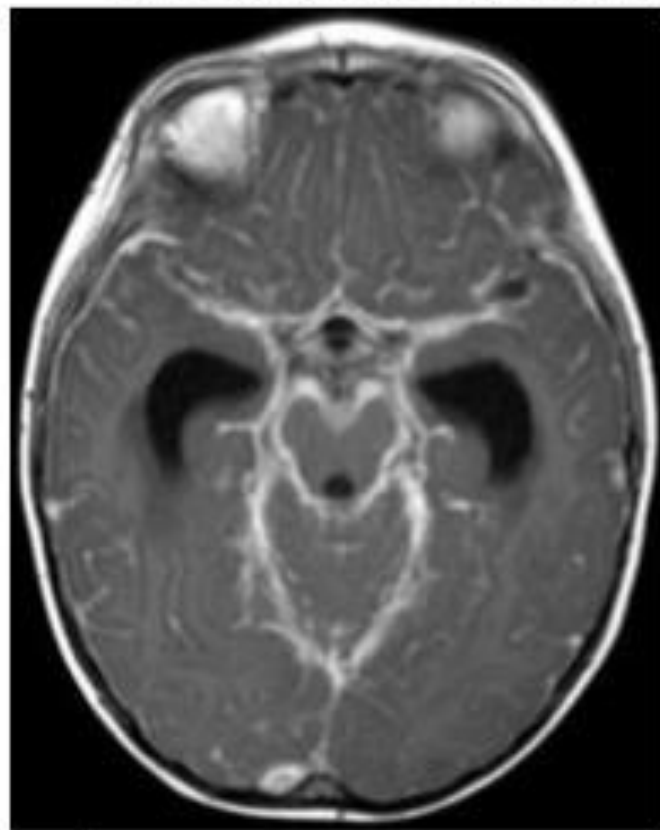
- Multiple sclerosis → not corrected because in this image
- most of the abnormality is seen in gray matter and MS is a white matter disease.
- Brain tumor: no the lesion is bilateral and cortical
- Meningitis, no the lesion cortical

Herptic encephalitis

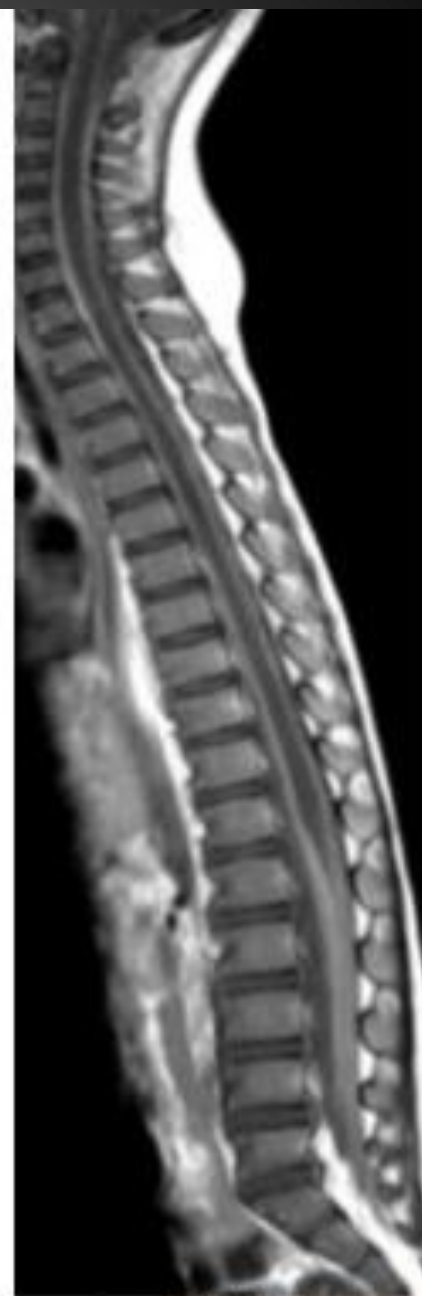


Bacterial meningitis

- ✓ infectious process involving the dura, leptomeninges, and CSF
- ✓ imaging studies usually not performed
- ✓ disease treated on a clinical basis

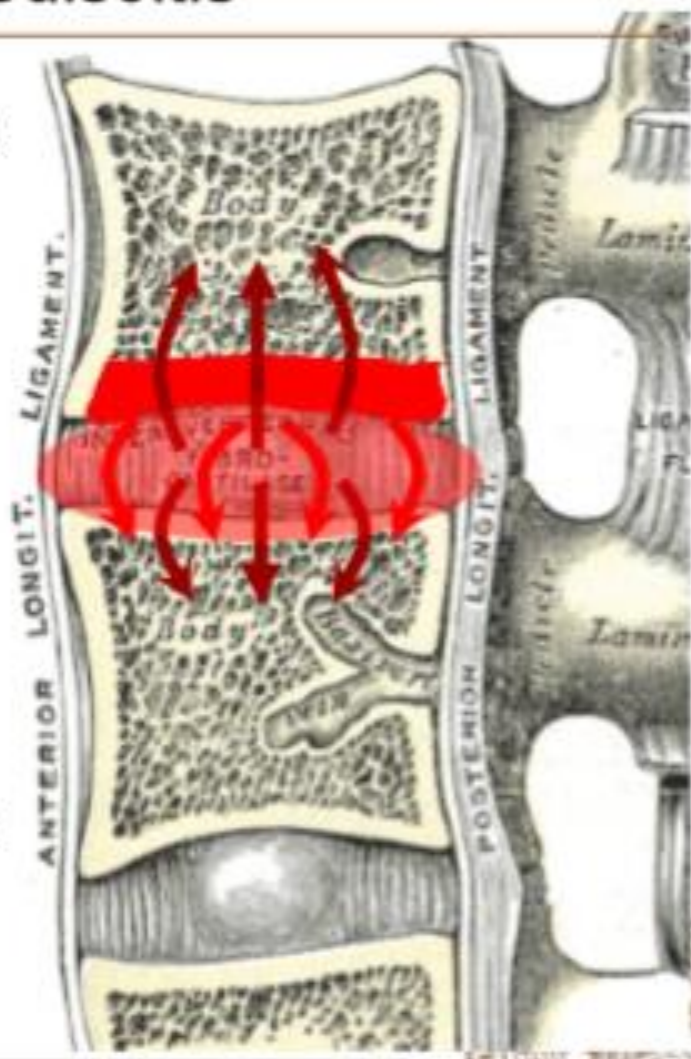


- diffuse leptomeningeal enhancement
- post-Gad "T2-like contrast"



Bacterial spondylodiscitis

- ✓ Staphylococci, streptococci from septic emboli (arterial and venous)
- ✓ traditionally believed to begin into the hypervascular pediatric disc
- ✓ probably infection starts in the vertebral body adjacent to the endplate, then proceeds to the disc, and eventually spreads to both adjacent bodies
- ✓ clinical features: acute onset with back pain, refusal to walk (*child*), irritability, fever, local tenderness



TB spondylitis

- ✓ usually secondary to extraspinal infection
- ✓ may be the initial manifestation of disease in children
- ✓ recrudescence of cases in Western countries
- ✓ infection usually starts in the anterior vertebral body and spreads under the anterior longitudinal ligament to adjacent vertebrae

