

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

وَمَا أُوتِيتُمْ مِنَ الْعِلْمِ إِلَّا قَلِيلًا ۗ

صدق الله العظيم

(سورة الإسراء - الآية ٨٥)

RADIOLOGY

REVIEW

LECTURE 5

CRANIAL SOL



BY

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Contrast



Is Mandatory in Brain SOL

**Suspicious
Diagnosis
Follow up**

In SOL , We need to **SEE** :

✓ **Exta or Intra Axial**

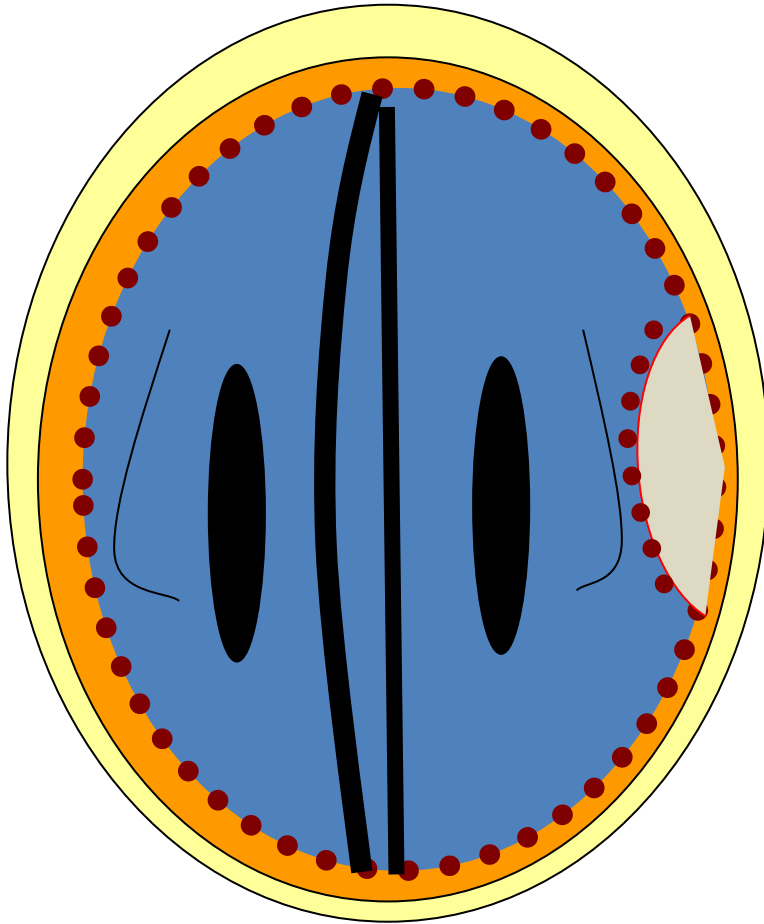
✓ **Mass effect**

✓ **Edema**

✓ **Enhancing pattern**

+ others : Ca, Hage, etc

MASS EFFECT



- ✓ Effacing Sulci
- ✓ Compression Vent.
- ✓ Shift Medline

CEREBRAL EDEMAS



TYPES OF EDEMA :

- **1- CytoToxic:** around infarct & hag

- **2- Vasogenic:** SOL

- **3-PeriVentricular:**

around Ventricles

=(Retrograde Transependymal CSF Permeation)

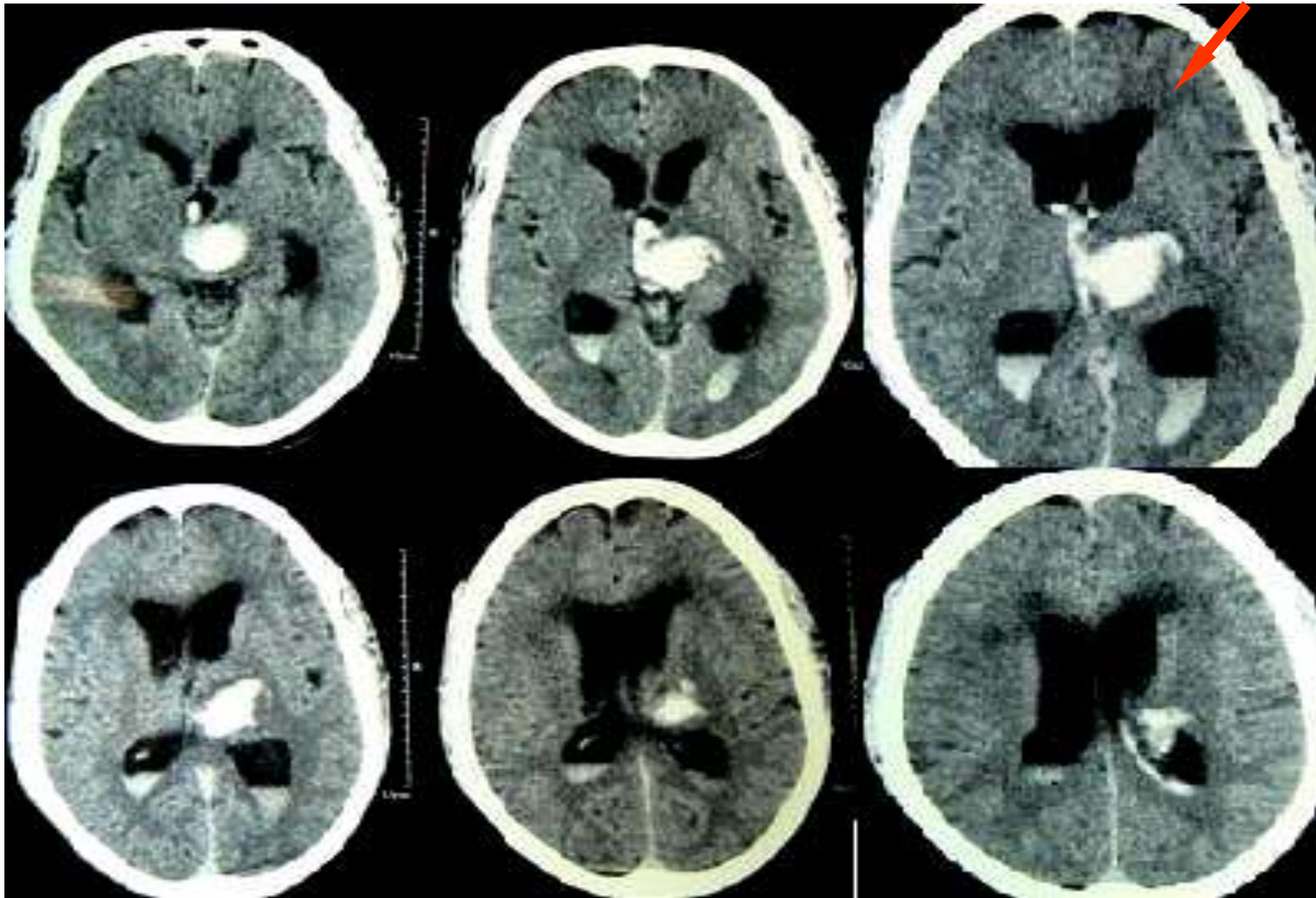




**cytotoxic oedema
(infarction)**



**vasogenic oedema
(tumour/abscess)**



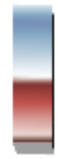
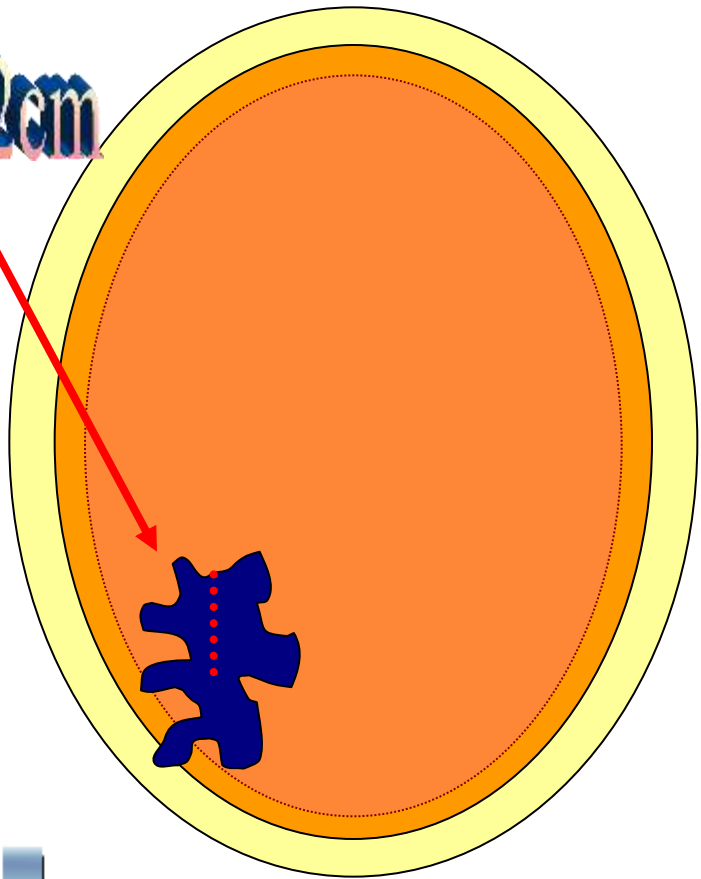
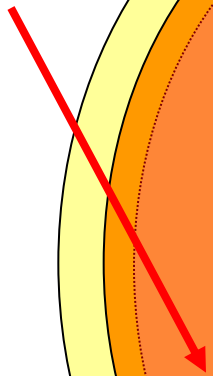
RETROGRADE TRANSEPINDYMAL CSF PERMEATION



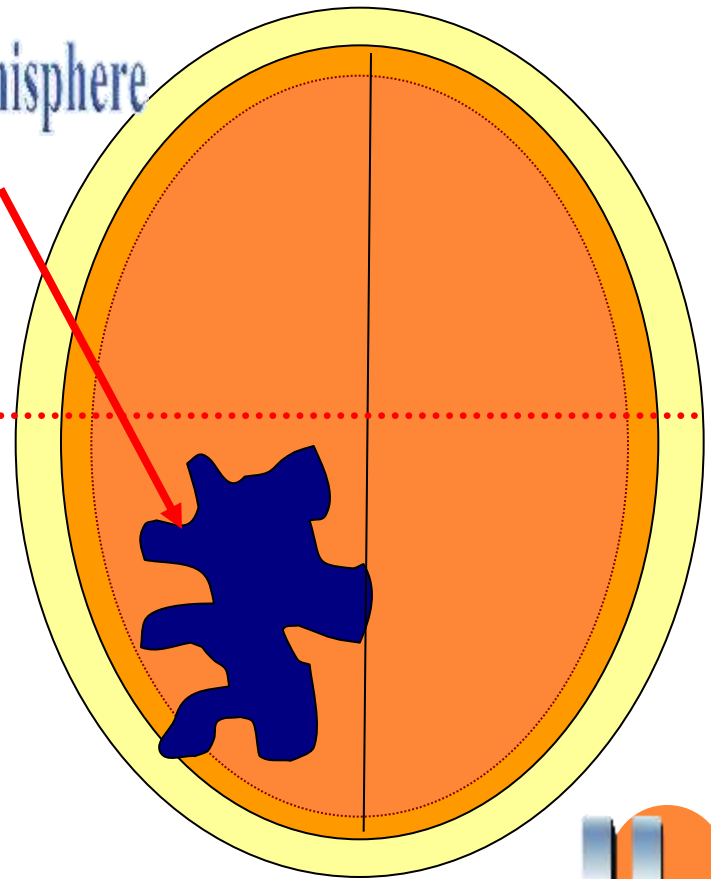
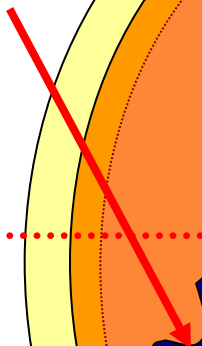
- Surrounding **edema** (if present)(grade I,II,III)
 - * **Grade I** = hypodense area **less than 2 cm** around the lesion
 - * **Grade II** = hypodense area **more than 2 cm** but less than 1/2 the cerebral hemisphere in which the lesion is present.
 - * **Grade III** = hypodense area **more than 1/2 the cerebral hemisphere** in which the lesion is present



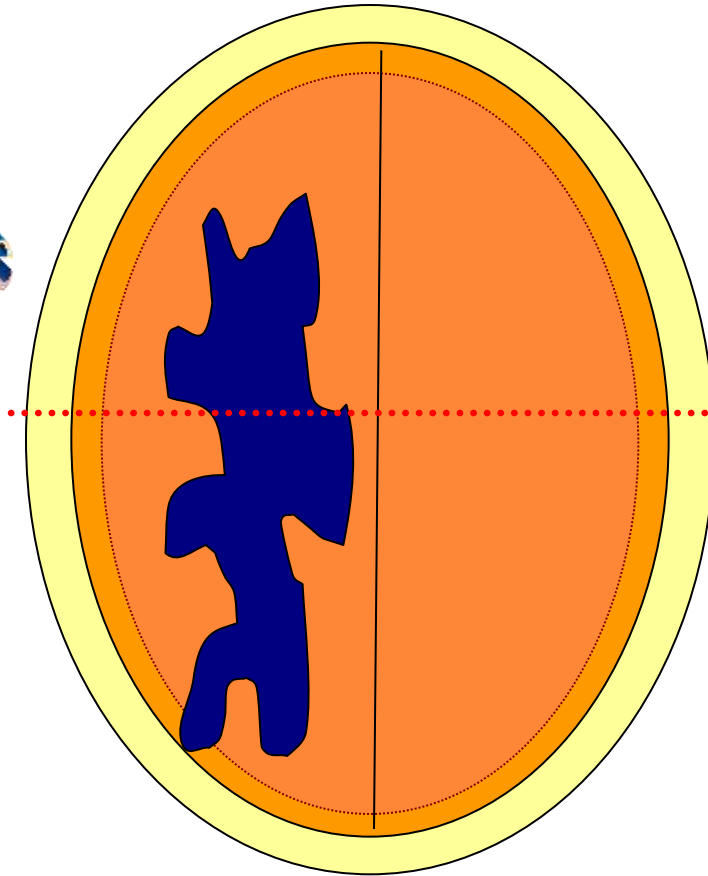
$\leq 2\text{cm}$



$> 2\text{cm}$
< Half Hemisphere



> Half Hemisphere

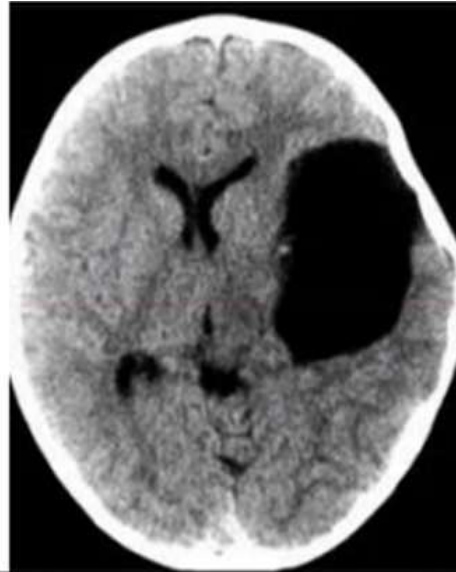


When you see SOL

IS IT EXTRA OR INTRA AXIAL ?



EXTRA AXIAL →



Meningioma

Homogeneous
Enhancement



Glioma

Heterogeneous
Enhancement



Glioblastoma

Non Uniform
Ring Enhancement

Arachnoid C

NON Enhancement

← INTRA AXIAL



When you see SQL

IS IT MALIGNANT ?



Signs Suggestive of Malignancy

- **1- Edema :**
 - Vasogenic
 - non related to lesion size
- **2- Enhancement :**
 - Heterogenous , non uniform ring > Homogenous > Non
- **3- Bone Destruction**
- **4- Multiple + 1ry = Mets**

When you see SOL

PATTERN OF ENHANCEMENT ?



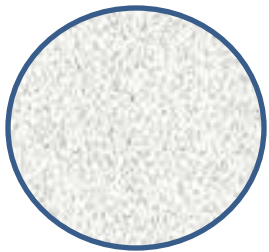
Patterns of contrast enhancing

Don't
Forget



Non enhancing

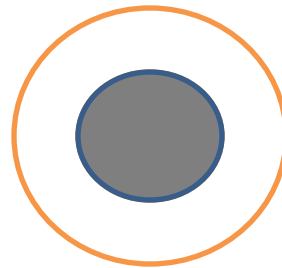
ENHANCING



HOMO



HETERO



Uniform



Non Uniform

MARGINAL



Glioblastoma
Non Uniform
Ring Enhancement



Abscess
Uniform Ring
Enhancement

Meningioma
Homogeneous
Enhancement



+ Edema



Glioma

Heterogeneous
Enhancement

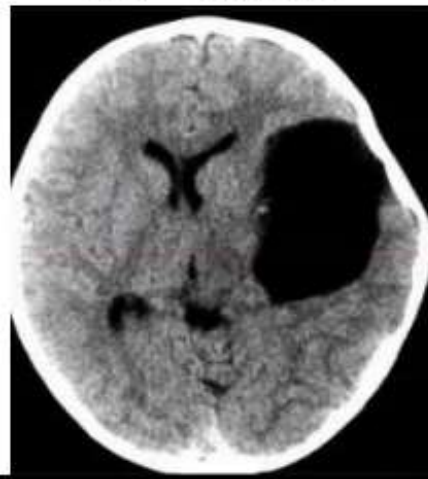
SOL ACCORDING TO CE

- Non Enhancing

EXTRA-AXIAL
ARACHNOID
EPIDERMOID
DERMOID
PINEAL

Arachnoid

"CSF – No Enh."



Epidermoid

Lobulated +/- Ca

T1 Low<CSF / T2 Hi>CSF

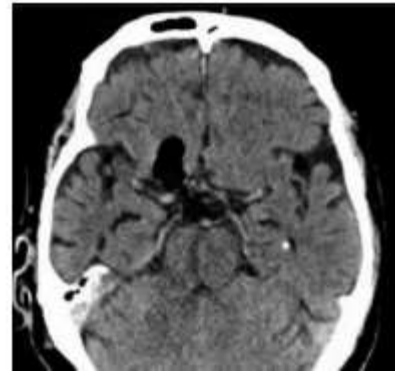


Dermoid

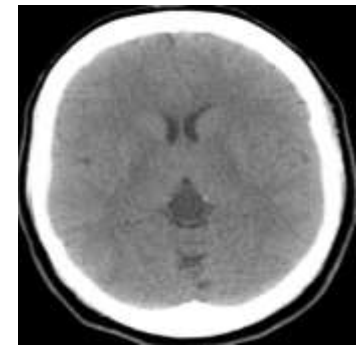
Rare

Fat +/- Ca

Rupture → Fat – Fluid level



Pineal Cyst



Arachnoid

"CSF – No Enh."



Epidermoid

Lobulated +/- Ca

T1 Low < CSF / T2 Hi > CSF



Dermoid

Rare

Fat +/- Ca

Rupture → Fat - Fluid level

SOL ACCORDING TO CE

- Non Enhancing

INTRA AXIAL

Hydatid Cyst



Porencephalic

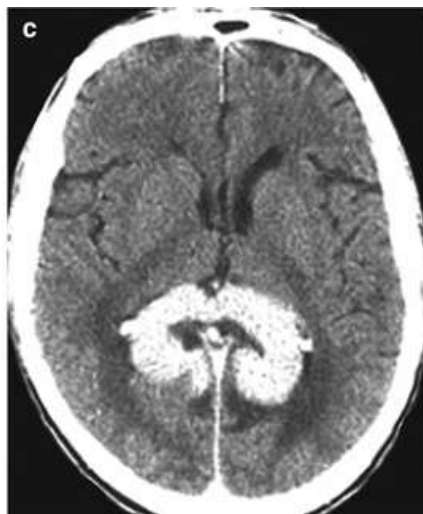


NB. Porencephally is not SOL

SOL ACCORDING TO CE

- **Homogenous**

MENINGIOMA	LYMPHOMA	GIANT CELL ASTROCYTOMA
<ul style="list-style-type: none">• Dural Based• +/- Dural tail	<ul style="list-style-type: none">• Peri-ventricular	<ul style="list-style-type: none">• With Tuberos Sclerosis• Near 3rd Ventricle



+ Subependymoma

Meningioma

- ✓ Homogeneous Enhancement
 - ✓ Dural Based
 - ✓ +/- Dural Tail



Lymphoma

- ✓ Homogeneous Enhancement
 - ✓ Peri ventricular
 - ✓ Small edema ورم طري



GCA

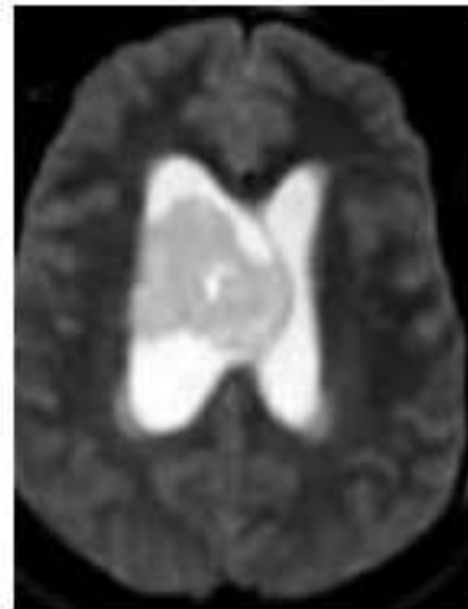
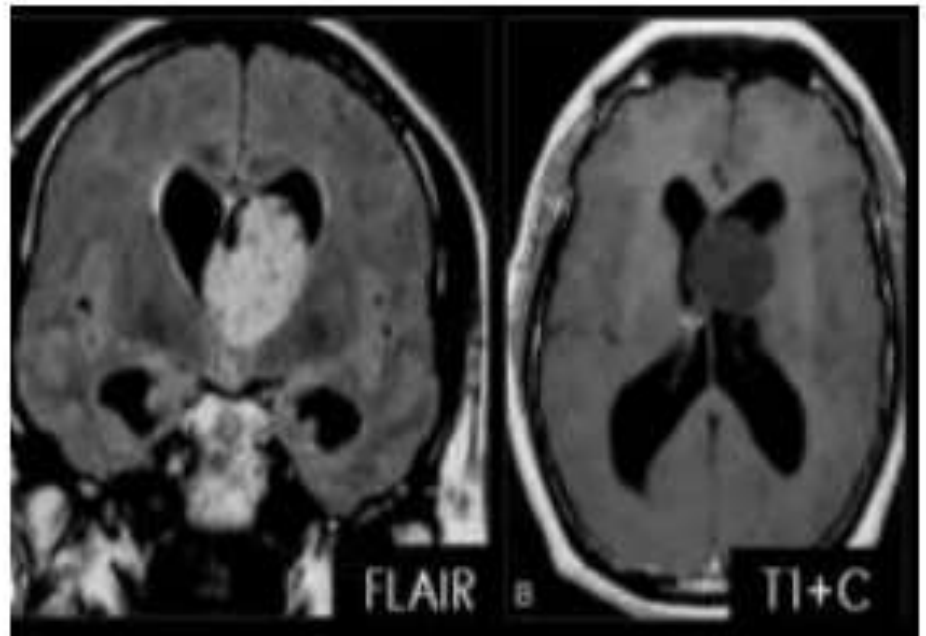
- ✓ Homogeneous Enhancement
 - ✓ 3rd V related
 - ✓ Small edema ورم طري



**With
Tuberous
Sclerosis**

→ SUBEPENDYMOMA:

- Variant of Ependymoma
- Benign - No CSF Seeding
- Males 60th
- Solid / Homogenous
- 60% → No Enh
- +/- Cyst , Ca , Hage - No Edema
 - CT → Iso
 - T1 iso / T2 Hyper
 -



SOL ACCORDING TO CE

- RING ENHANCING



Glioblastoma

**Non Uniform
Ring Enhancement**

+

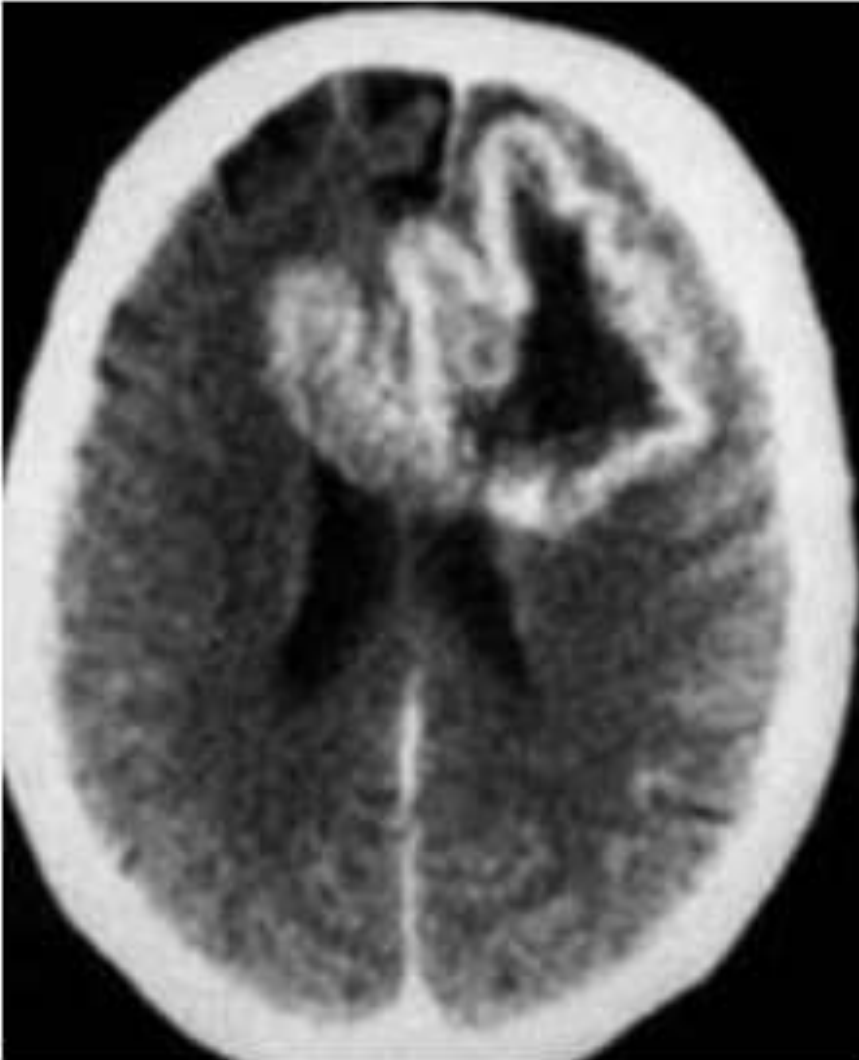
Clinical



Abscess

Uniform Ring Enhancement

Glioblastoma Multiform



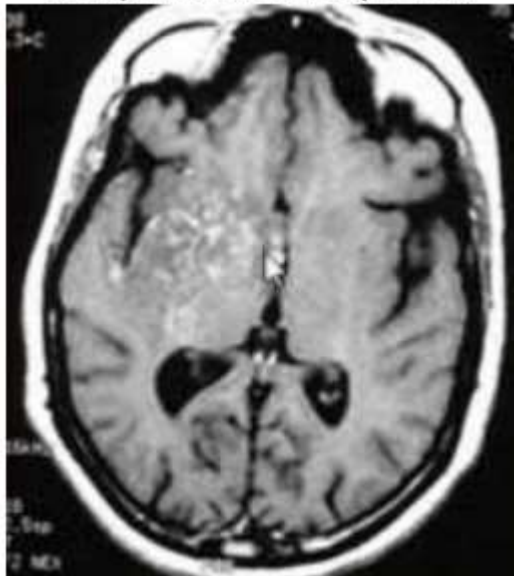
**AS IT MULTIFORM
→ MANY PATTERNS
OF ENHANCEMENT**

SOL ACCORDING TO CE

- Heterogeneous ENHANCING

USUALLY NON BENIGN

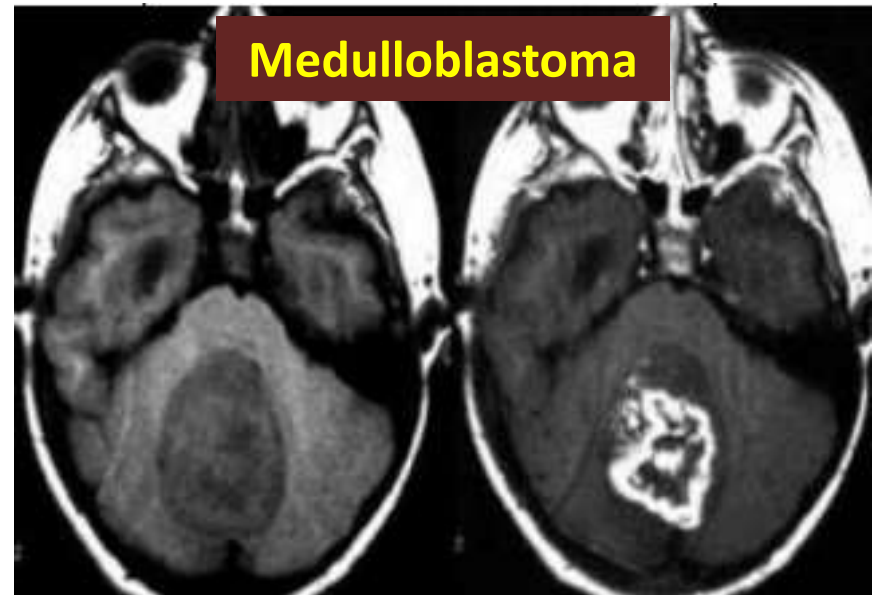
Anaplastic Astrocytoma



Glioma



Medulloblastoma



DOES CALCIUM HAS ROLE ?

Calcification should be mentioned present or not

- (70-90% of **Oligodendrogliomas** are calcified)



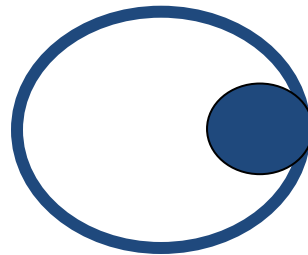
METS

Keys

- **Multiple + 1ry**
- **Any pattern of Enhancement**
- **Large edema non related to lesion size**

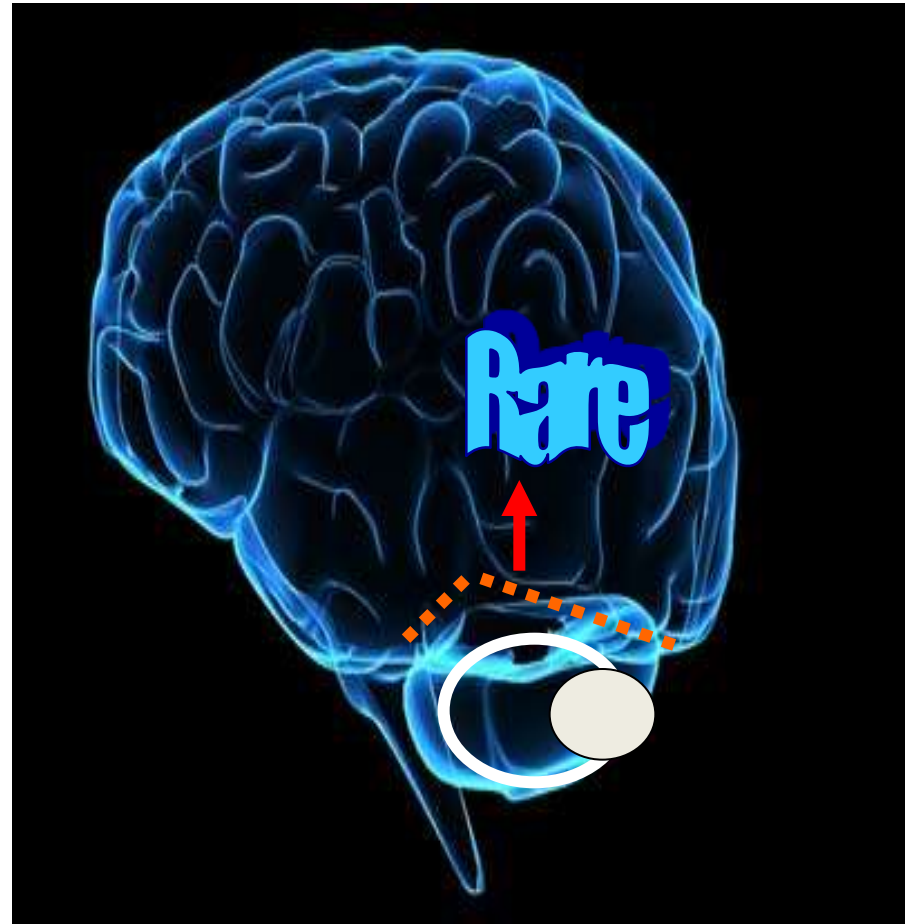


**CYST
WITH
ENHANCING MURAL NODULE**



PiloCytic Astrocytoma

- Post.Fossa UsuaLLy / Rare SupraTent
- Cyst e Enhancing Mural nodule
- Contrast may diffuse inside → **Fluid Level.**



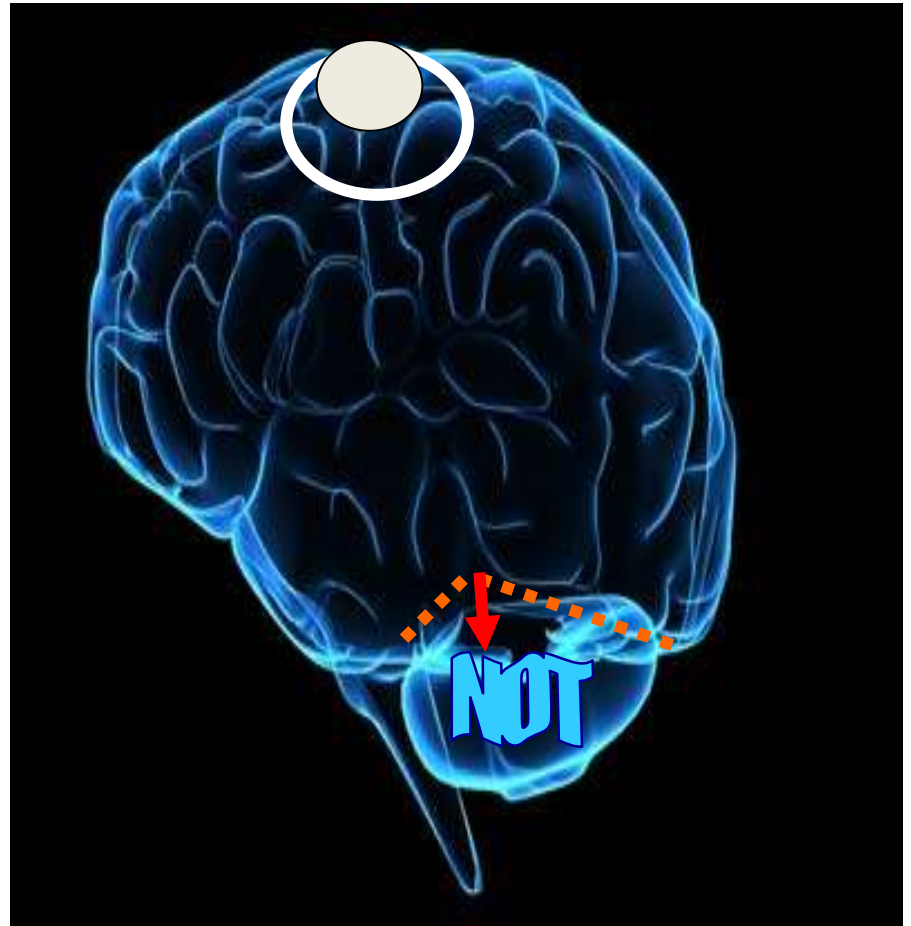
• **P**ILOCYTIC ASTROCYTOMA

Posterior Fossa

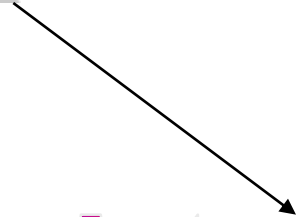
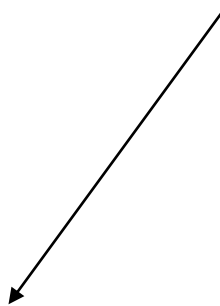


Pleomorphic Xantho Astrocytoma

- Supra tent / NOT INFRA
- Cystic Enhancing Mural nodule (**Superficial**)



P.X.A



Posterior Fossa

Astrocytoma

NOT

→ D.D. ←

PXA / Meningioma e Cystic components

- Compare Tumore size (nodule) / Cyst.

→ **Cyst** > Nodule →

PXA

PXA

→ **Cyst** < **Tumor** →

MENINGIOMA

CYSTIC COMPONENT.



HIGH GRADE GLIOMAS

- **Diffuse**
AStroCytoma

Non Enhancing

(but enhancing can occur after operative).

** Key : Clinical*



- **ANAPLASTIC**
ASTROCYTOMA

+/- Patchy Enhancing



-No Hemorrhage

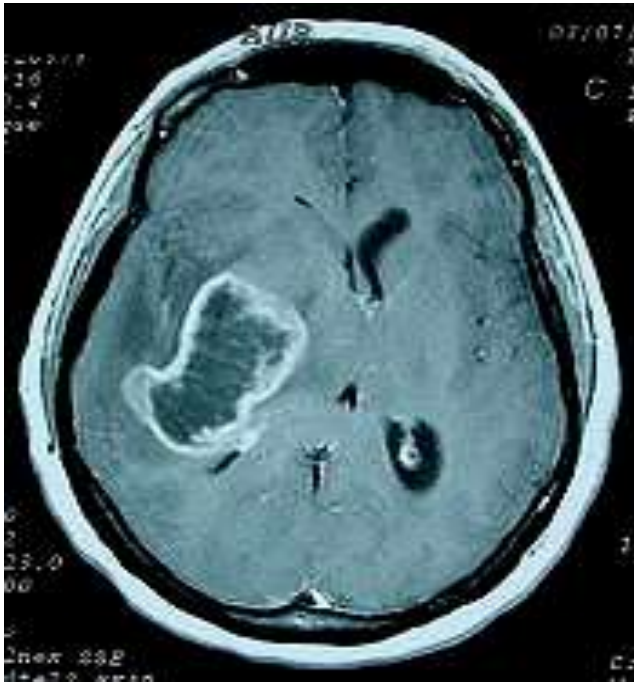
-No Necrosis

-High Malignant = NO Resistance

GB MULTIFORM

Non Uni Marginal

HETEROGENOUS



- **This is not All others**
 - **CPA Lesions**
 - **Intra ventricular Lesions**
 - **Posterior Fossa Trauma**

..... PLEASE REVIEW SUMMARY FILE

Scheme of Diagnosing Cranial SOL

- ✓ **Site** → Intra / Extra axial , Lt / Rt , Lobe
- ✓ **Size**
- ✓ **Shape**
- ✓ **Surface (Outline)**
- ✓ **Density +/- Cystic Changes**
- ✓ **Mass effect**
 - ✓ +/- Emeda
 - ✓ +/- Ca (In pre contrast Scan)
 - ✓ +/- Haemorrhage (In pre contrast Scan)
 - ✓ **Enhancement (No / Yes → type)**



NEXT

CT BRAIN REPORTING

SOURCES & FURTHER READING

- Lectures of Prof. Mamdouh Mahfouz
- Prof. Mamdouh Mahfouz Reporting File
- <https://radiopaedia.org/>
- <https://pubs.rsna.org/>
- <https://emedicine.medscape.com/>

Thank You

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