

Intracranial Tumors.

Objective

- Outline 2016 classification of cns tumors,
- Outline clinical presentation and diagnosis of cns tumors
- Outline principles of management of cns tumors

- Originate from neural elements in the brain or represent metastatic disease.
- Primary brain tumors account for 50% of i.c neoplasms, the rest are metastatic lesions.
- In adults, 2/3rds are supratentorial, while in children, 2/3rds are infratentorial.

2016 WHO Classification

- Emphasizes genetic and molecular markers in tumor classification.
- An improvement on the 2007 grading.
- **Diffuse astrocytic and oligodendroglial tumors:**
 - -diffuse astrocytoma: IDH mutant or IDH wild type, NOS.
 - -gemistocytic astrocytoma IDH wild type.

2016 WHO classificatio

- Anaplastic astrocytoma: IDH mutant, IDH wild type, NOS.
- Glioblastoma: IDH mutant, IDH wild type, NOS.
-gliosarcoma, -giant cell glioblastoma, -epithelioid glioblastom
- Diffuse midline glioma, H3 K27M- mutant.

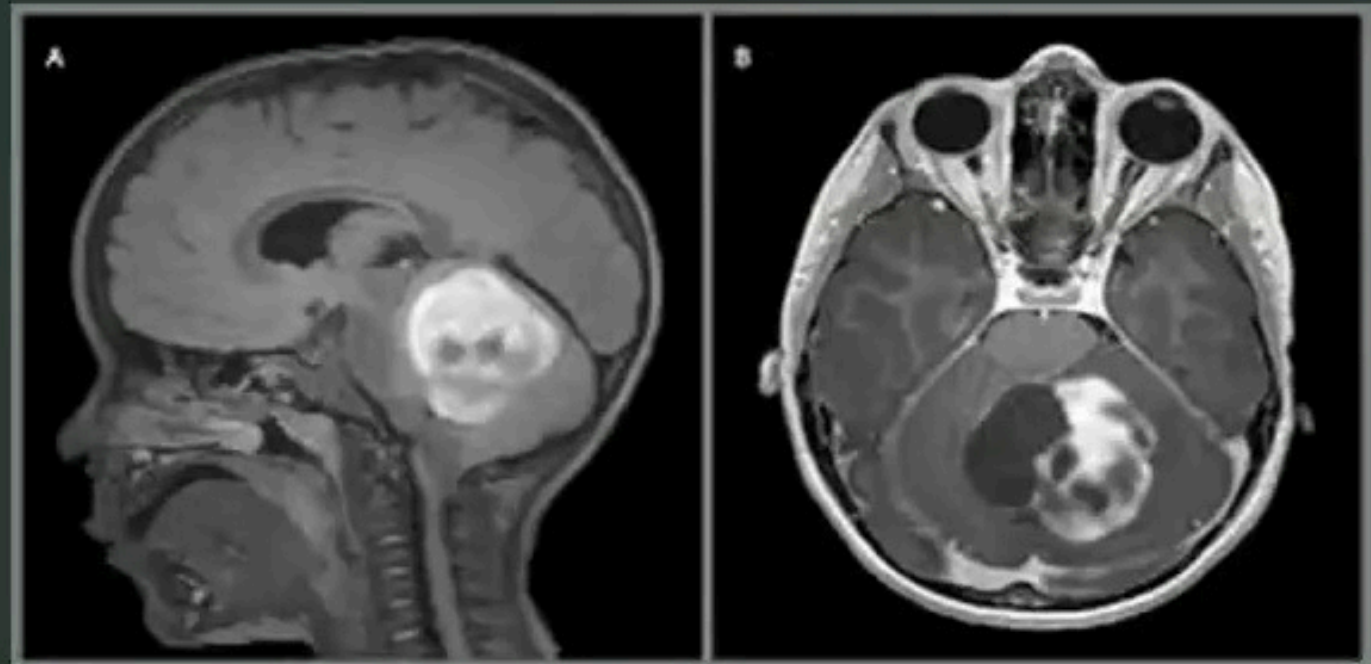
2016 WHO classificatio

- Oligodendroglioma : IDH mutant, 1p/19q-co deleted, NOS.
- Anaplastic oligodendroglioma: IDH mutant, 1p/19q-co deleted NOS.
- Oligoastrocytoma: NOS.
- Anaplastic astrocytoma: NOS.

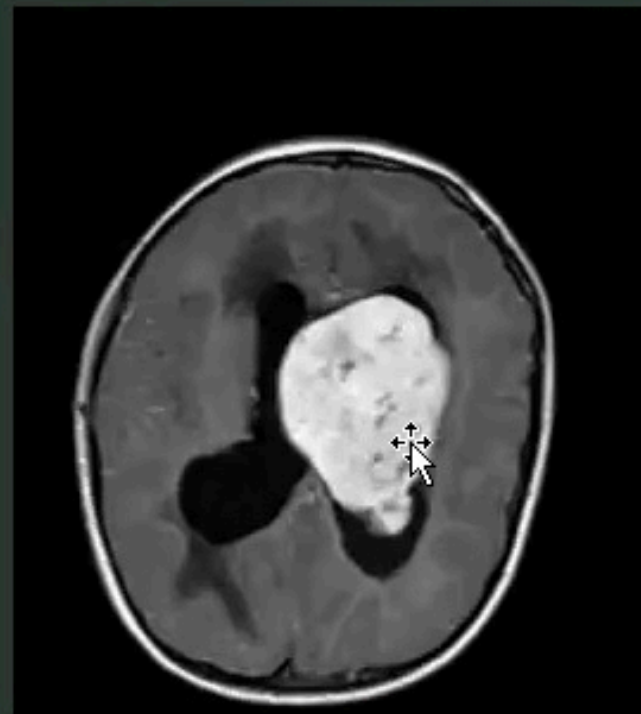
2016 WHO classificati

- **Other Astrocytic tumors:**
- -pilocytic astrocytoma.
- -pilocytic astrocytoma.
- -subependymal giant cell astrocytoma.
- -pleomorphic xanthoastrocytoma.
- -anaplastic pleomorphic xanthoastrocytoma.

Pilocytic astrocytoma



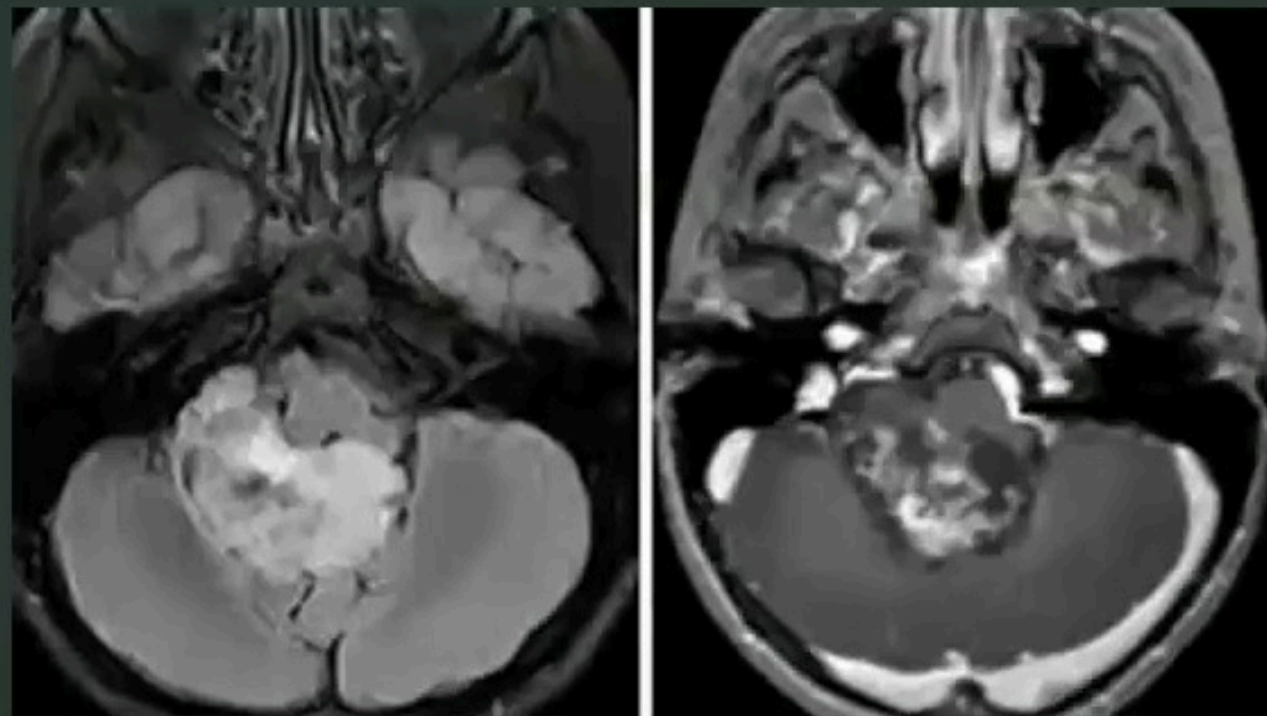
Subependymal giant cell astrocytoma



2016 WHO classificati

- Ependymal tumors:
- -subependymoma,
- -myxopapillary ependymoma,
- -ependymoma; papillary, clear cell, tanycytic.
- -ependymoma, RELA fusion positive.
- -anaplastic ependymoma.

Ependymoma



Supratentorial ependymoma



2016 WHO classificatio

- Other gliomas:
- -chordoid glioma of the third ventricle,
- -angiocentric glioma,
- -astroblastoma.

2016 WHO classificatic

- Choroid plexus tumors:
- -choroid plexus papilloma,
- -atypical choroid plexus papilloma,
- -choroid plexus carcinoma.

2016 WHO classificatio

- **Neuronal and mixed neuronal-glial tumors:**
- -dysembryoplastic neuroepithelial tumors,
- -gangliocytoma,
- -ganglioglioma,
- -anaplastic ganglioma,
- -dysplastic cerebellar gangliocytoma (Lhermitte –Duclos disease).

WHO 2016, Neuronal and mixed neuronal-glial tumors

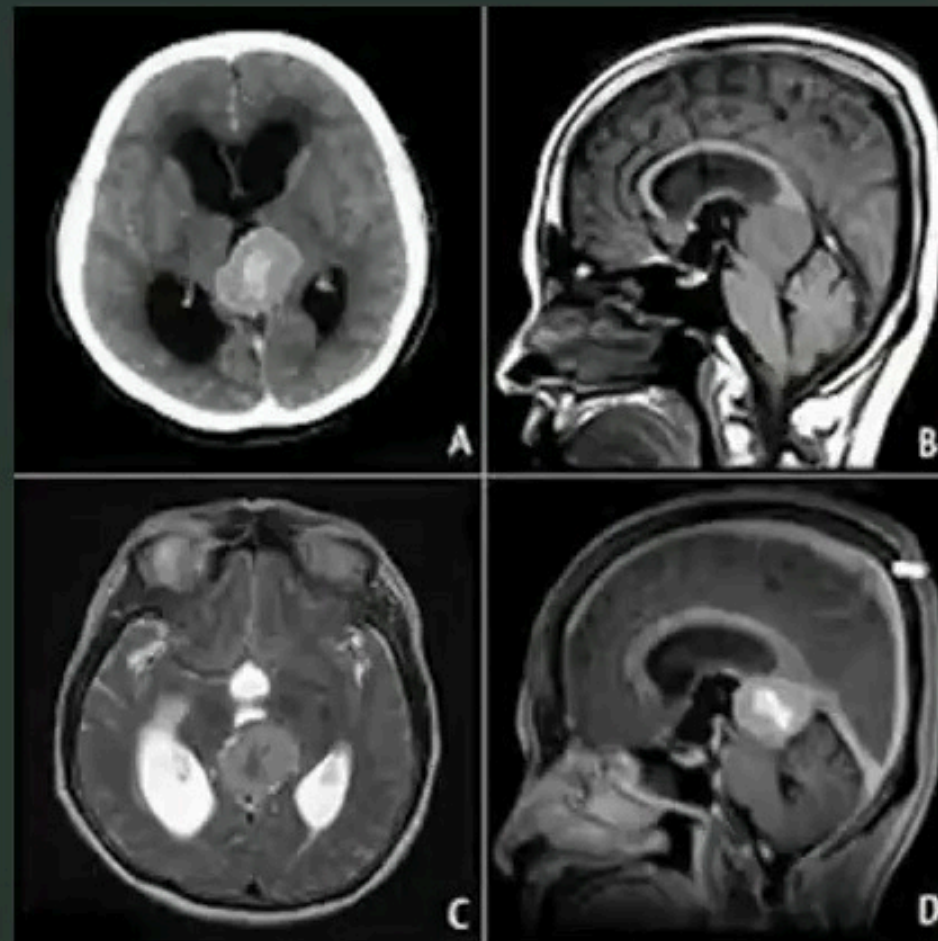
- -desmoplastic infantile astrocytoma and ganglioglioma.
- -papillary glioneural tumor,
- -rosette-forming glioneural tumor,
- -diffuse leptomeningeal glioneural tumor,
- -central neurocytoma,
- --extraventricular neurocytoma,

- Neuronal and mixed neuronal-glial tumors:
- -cerebellar liponeurocytoma,
- -paraganglioglioma

WHO 2013

- Tumors of the Pineal Region:
- -pineocytoma,
- -pineal parenchymal tumor of intermediate differentiation,
- -pineoblastoma,
- -papillary tumor of the pineal region.

Pineal region tumors



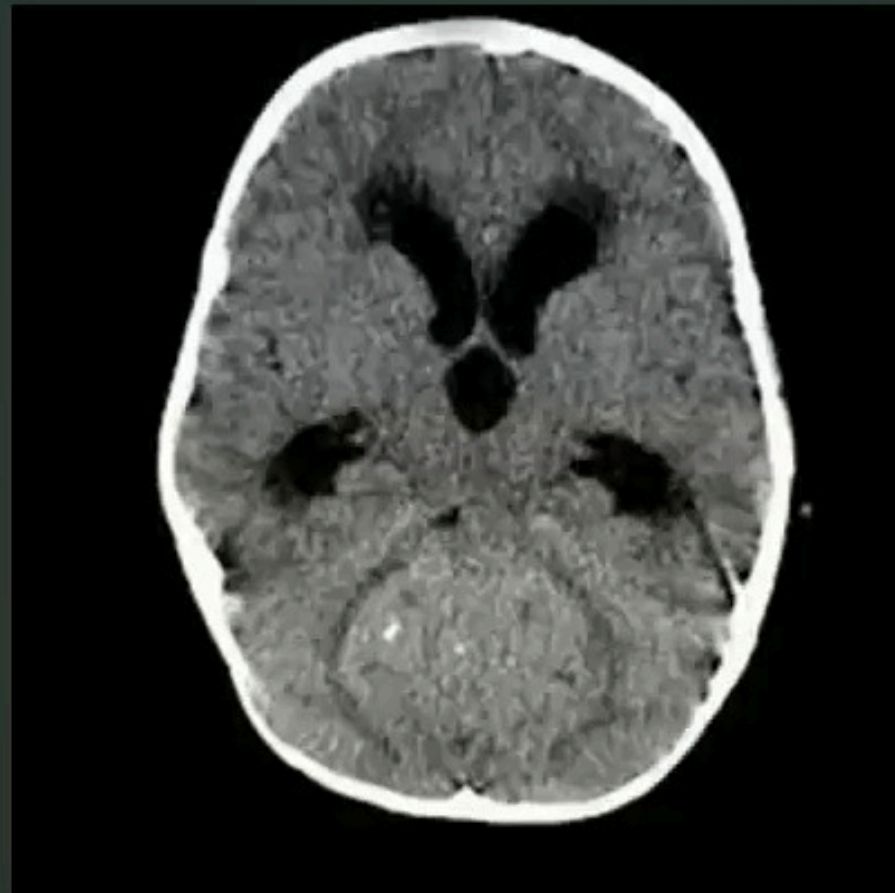
WHO 2013

- **Embryonal Tumors:**
- -Medulloblastomas; WNT-activated/, SHH-activated and TP-53 mutant/, SHH-activated and TP-53 wild type/,
- -Medulloblastoma, non-WNT/ non-SHH; group3 and group4.
- -Medulloblastomas, histologically defined; classic, desmoplastic/nodular, extensive nodularity, large cell/anaplas
- Medulloblastoma, NOS.

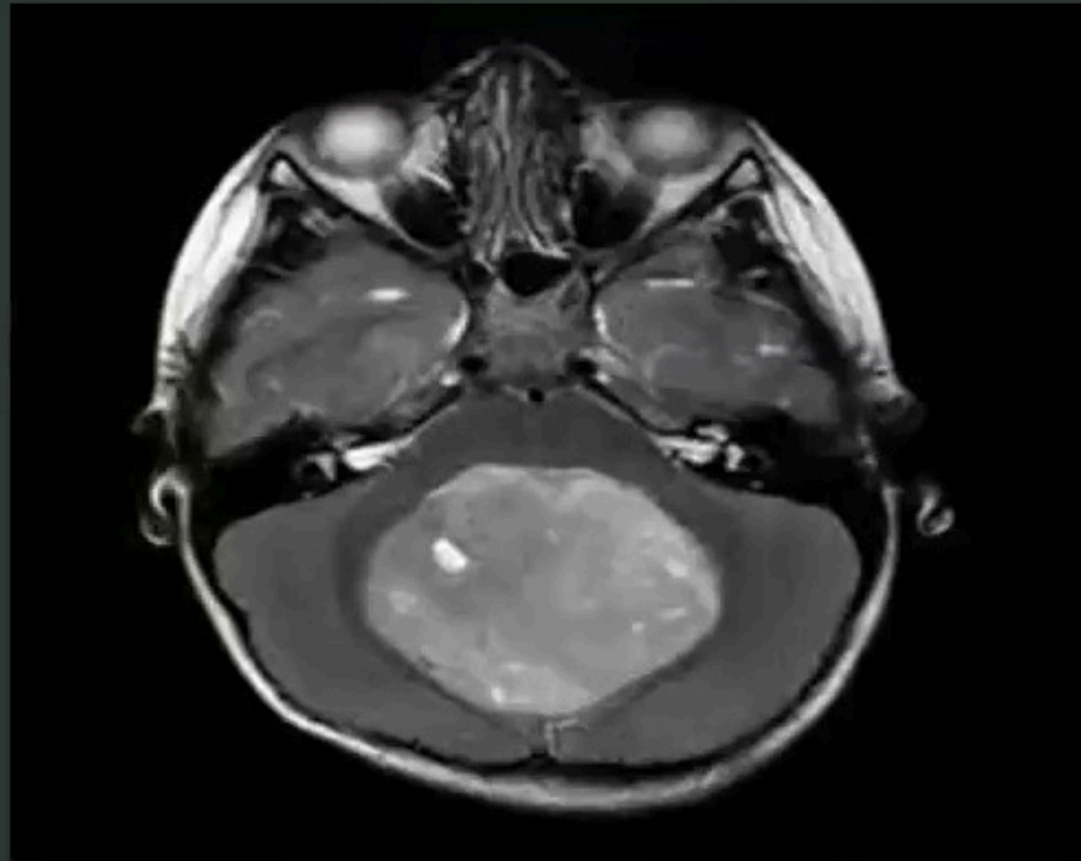
WHO 201

- -embryonal tumor with multilayered rosettes; C19MC-alterec NOS.
- -medulloepithelioma,
- -cns neuroblastoma,
- -cns ganglioneuroblastoma,
- -cns embryonal tumor, NOS
- -atypical teratoid/rhabdoid tumor
- -cns embryonal tumor with rhabdoid features.

Medulloblastomas



Medulloblastoma MRI Brain.



WHO 201

- Tumors of the cranial and paraspinal nerves:
- -Schwannoma; cellular or plexiform.

Presentatio

- Insidious onset, but acute episode represents hemorrhagic transformation or acute ventricular obstruction.
- Headache
- Altered mental status,
- Ataxia, nausea, vomiting
- Weakness,
- Gait disturbance.

presentatic

- Focal seizures,
- Visual changes
- Speech deficits
- Focal sensory abnormalities.

presentatic

- Presentation is dependent on the variability in size, location, pathology and rate of the tumor.
- Symptoms are either focal or generalized.
- Generalized symptoms are due to mass effect from raised ICI or direct global dysfunction from the lesion, e.g. invasive tumor

Presentation

- Headache accounts for 48-56% of brain tumor patients.
- Can be localized or global. Intensity and progression can give insight into rate of growth of the tumor.
- Headache is not accurate for localization.
- Sudden increase in intensity of headache usually suggests hemorrhagic transformation.

Presentation, Cognitive change

- Cognitive changes (35%), present and may persist even after tumor treatment, affecting Q.O.L.
- Spectrum includes, memory lapses, personality changes and mood disturbances.
- These may be acute or subtle especially in the senior population.

Presentation: Seizure

- Seizures (32%) may form part of the presentation, or manifest later.
- May be general or focal
- Patients with primary brain tumors are more likely to present with seizures than those with mets.
- Additionally, LGGs have more seizure presentation than HGG

Presentation: Seizure

- Seizures result from secondary irritation of the cortex from the tumor or peritumoral edema.
- They are more common in temporal, frontal, parietal , and occipital lobe lesions in decreasing freq.
- Brainstem and cerebellar lesions 'almost never' cause seizures.
- Jacksonian march phenomenon for lesions around the primary motor cortex.

Presentation: Seizure

- Seizure treatment in tumor patients varies from case to case, seizure prophylaxis is generally not advised.
- AEDs are for patients with seizures or who develop a seizure the course of tumor management. Also for high risk patients e temporal lobe lesions.
- Leviteracetam is a drug of choice. Perform EEG before dc seizure meds. 2 year treatment of seizure free interval is safe dc.

Presentation: Nausea, Vomiting

- Nausea and vomiting (13%) usually results from increasing ic
- May represent lesions in the brainstem or posterior fossa.

Presentation: focal symptom

- Motor deficits. (33%).
- Language deficits (32%).
- Visual deficits. (22%).
- Sensory deficits (13%).
- Dizziness, loss of balance, ataxia (9%).

Presentation: focal symptom

- Focal motor deficits result from lesions located in and around precentral cortex.
- Lesions in the prefrontal cortex, caudate nucleus and basal ganglia may cause weakness with impaired fine motor coordination.
- Peritumoral edema may cause motor weakness even from an adjacent lesion, improves on steroids.

Focal symptom

- Sensory deficits from lesions or peritumoral edema in the postcentral gyrus.
- Include graphesthesia, stereoagnosia, loss of proprioception, and abnormalities in pain and touch sensation.

Focal deficits

- Aphasia and language deficits (30-53%) of brain tumors.
- Broca's aphasia, inability to express thoughts.
- Wernicke's aphasia, inability to comprehend speech.
- Global aphasia, both Broca's and Wernicke's centers affected.
- Anomic aphasia, when the lesion damages the left temporal region with other language pathways. The patient can't find the next word in a sentence.

Physical findings

- Papilledema, suggesting raised ICP
- Diplopia
- Parinaud's syndrome, up ward gaze palsy
- Anosmia , frontal lobe tumors.
- Brainstem and cerebellar tumors, multiple CN palsies, ataxia.

Physic

- Homonymous hemianopsia for occipital lobe tumors.
- CP angle tumors; VII, VIII, palsies

Differential Diagnos

- Acute subdural hematomas,
- Acute epidural hematoma,
- Encephalitis
- Ischemic stroke, hemorrhagic stroke.

Investigation

- Laboratory , baseline, genetic screening for familial tumors.
- Neuroimaging
- Biopsy-stereotactic, open.

Diagnos

- CT scan : surgical planning, review of metastatic work up.
- -unstable patients, where mri is contraindicated.

Diagnos

- MRI brain or neural axis: better tumor anatomy with relations, metastatic seeding, vascular evaluation and arachnoidal plan
- PET scans: for detecting malignancies, with high metabolic rates, useful for guiding biopsy.
- SPECT: utilizes radioisotopes for detection of BBB abnormalities. Can distinguish benign from malignant lesions
Should select areas for biopsy.

Treatme

- Goals:
- control symptoms,
- Eradicate disease,
- Prevent complications.

Treatme

- Kernofsky performance score of >70%, good for surgical outcome.
- Decompression,
- Radiotherapy; linac, whole brain, stereotactic
- Chemotherapy
- Follow up.

Gallery GBM

Right frontal GBM

Florid perilesional edema,

Mass effect.

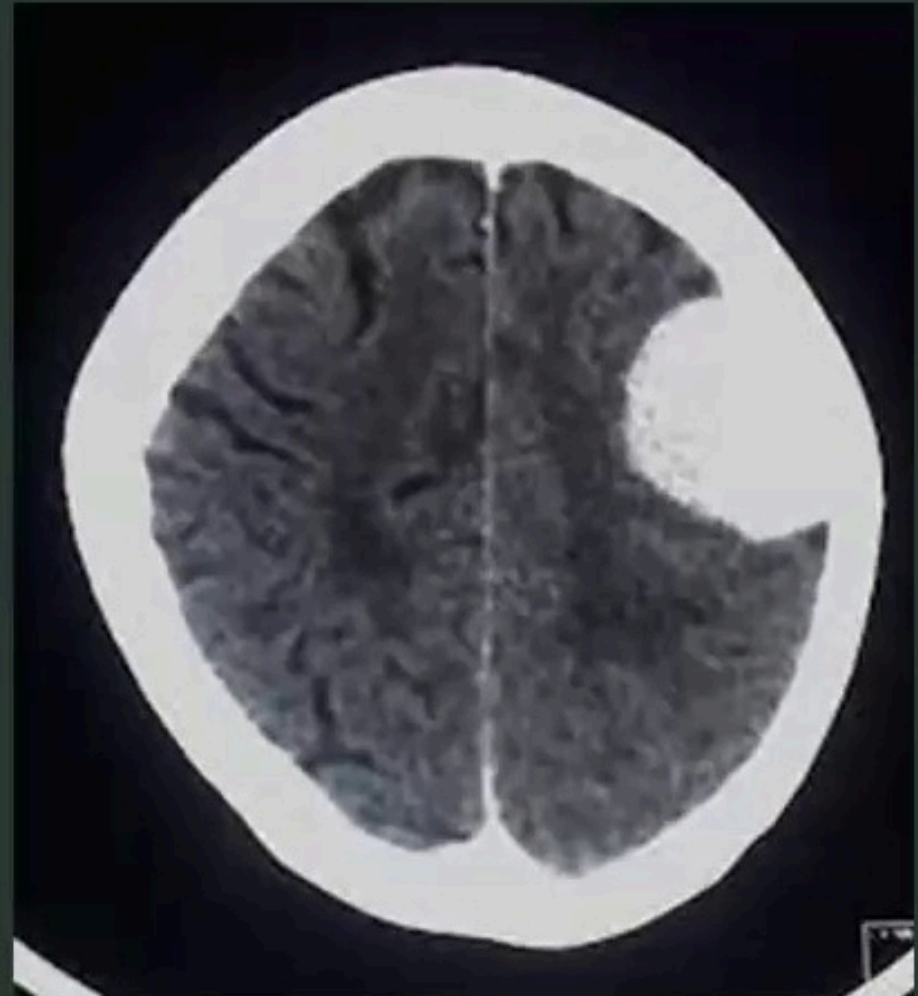


Convexity meningioma on CT Head

Broad dural base,

Extra axial,

Perilesional edema



Left occipital
convexity
meningioma on
MRI brain.

