Brain Tumors

*onset &

sec - min → ischemia (sudden onset)
[stroke, TIA]

min-hours → hemorrhage

hours - days → infection

weeks - months → tumors. (neoplastic lesion)

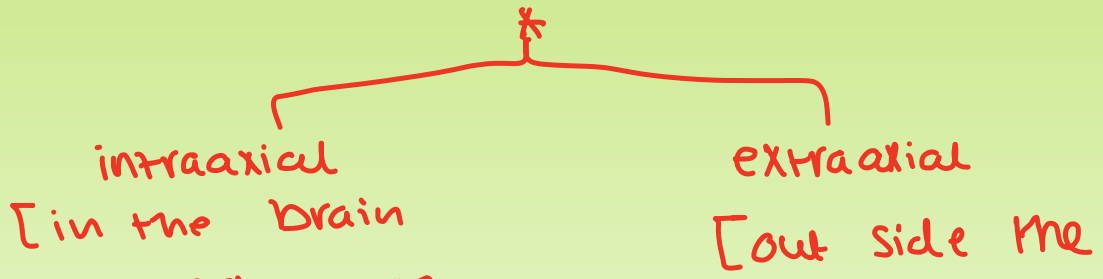
more → degenerative disease

- Brain tumors are neoplastic growth within the brain.
- They can be primary(30%) or Secondary metastatic(70%), benign or malignant.

- Meningioma is the most common benign tumor overall in cadaveric studies ,while in clinical studies most common primary benign tumor is GBM.

Glioblastoma.

- Most common sources of mets:
- Lung
- Breast
- GI tract
- Kidney
- Melanoma



parenchyma]
mc 8 metastisis

Brain parenchyma, From surrounding tissue: bone, meninges]

Clinical evaluation

- Obtain a thorough patient history and neurological examination.
- Suspect a brain tumor in patients with clinical features including: Headache /vomiting /sezure. (generalised symptoms);

-Headaches (especially with headache red flags):

* progessive
* not respond to analgesia.
* thunderclap headache

1. Recurrent vomiting
2. Change in sensorium(Level of consciousness)
3. Other signs of elevated intracranial pressure (ICP), e.g., papilledema (early morning headache)
4. New onset seizures
5. Focal neurological deficits depending on tumor location, e.g., sensory deficits or focal motor weakness
6. Cognitive, behavioral, and personality changes

* brain tumor rarely

appearance (microscopic) ↑

spread (local invasion) ↑ (not size)

metastasised.

- Grade vs. Stage: grade describes the appearance , stage describes size of tumour + how far it has spread from where it originated .
- Also we classify them into : intra-axial, extra -axial tumours

↗ in the brain parenchyma.

داخل parenchyma

- WHO classification is according to :
- 1) histological appearance , into grades
- 2) Genetic mutation

Grading; 4 grades

- Grade 1: cells looks like normal cells , slowly growing and likely to spread .Surgery is the only treatment you need . (well demarcated)
- Grade 2: cells look less normal, slowly growing but grow into near brain tissue .They have high recurrence rate after surgery comparing to grade 1 and some can develop into malignant tumour. (diffuse)
- Grade 3 : tumour grows quickly, likely to spread into nearby tissue , cells are very different from normal cells (anaplastic)
- Grade 4:Tumor grows + spread very quickly , tumour cells doesn't look like normal cell. (there are necrotic cells) (central necrosis)

↳no blood supply at the center.

- Intra-axial is intra parenchymal, neuromas and gangliogliomas, gliomas (astrocytoma +oligodendromas + glioblastoma+oligoastroglioma). They are infiltrative , they infiltrate to normal brain tissue , so we can't differentiate it from the normal brain parenchyma even grossly.
- Extra – axial is out of parenchyma, ex. Meningioma, ex. hemangioblastoma (From the surrounding tissue) ex: bone, meninges.
- Histological appearance depend on the type of tumour

Ex) pilocytic astrocytoma (low mitotic index)
EX) oligo dendroglioma , can be either low mitotic index so grade 1,
Or with high mitotic index so grade 2
EX)oligo astrocytoma is grade 2
EX)Diffuse astrocytoma is grade 3

Diagnostic imaging

(gold standard)

contraindication in patient with end stage renal disease

1) Gadolinium-enhanced MRI head: preferred because it's the best at visualizing soft tissue structures and vascularity.

لكن في العادة ما بنجرف

- gold standard to detect brain tumor is : MRI with contrast

انه عنه الهردين tumor

- On MRI : hyperintense not dense

لهاي ما بنكلها ودائي.

ممكن نطلب CT (سريعة).

2) CT head and neck with IV contrast (iodine): if MRI is not possible.

Contraindications of MRI : Metal(retained bullets, prosthesis ,pace-maker)

Relative Contra-indications: claustrophobia

It's advised not to do MRI in the first 4 weeks of pregnancy

Contraindications of giving Contrast(gadolinium) in MRI : End stage Renal disease

If you give Gadolinium-enhanced MRI contrast to a patient with End stage renal disease ? 7% chance to develop Nephrogenic systemic fibrosis (gadolinium nephrogenic systemic sclerosis)

- note : common neurosx complication of end stage renal disease patients who are on hemodialysis is infection that may speared to brain and spine .

- Remember : we can use CT with or without iodine based contrast ,in MRI the T1 is the only modality on MRI that contrast can be used.

3) Biopsy for histologic diagnosis.

حسب نوع الـ tumor في :

* incisional biopsy → tumor منأخذ جزء من
* excisional biopsy → tumor بنشيل الـ

. pathology تحديد على د

Treatment

Treatment is based on type of tumor:

* اغلب الاورام بتحتاج surgery

ممكن عشان exsicion ، biopsy.

- Surgery
- Radiation: Whole brain radiotherapy (WBRT) , Stereotactic radiosurgery (SRS) /"that also called gama knife radiosurgery that can cauterization to specific area".

* SRS & multiple beams تتجمع في نقطة واحدة في د brain . (لبؤرة) ex: gamma knife.

- Chemotherapy
- Glucocorticoids for ↓ ICP

. vasogenic edema د بتخفف حول د tumor.

*interstitial edema in hydrocephalus [periventricular seepage]

Types of brain edema :

1. Cytotoxic : Accumulation of fluid inside the cells(intra-cellular)

2. vasogenic : Accumulation of fluid Intra/extra cellular due to many underlying mechanisms(Breakdown of blood brain barrier due to brain tumor which releases cytotoxins making the vessels leaky .

Treatment is by glucocorticoids in acute stage, which stabilizes Blood Brain Barrier.

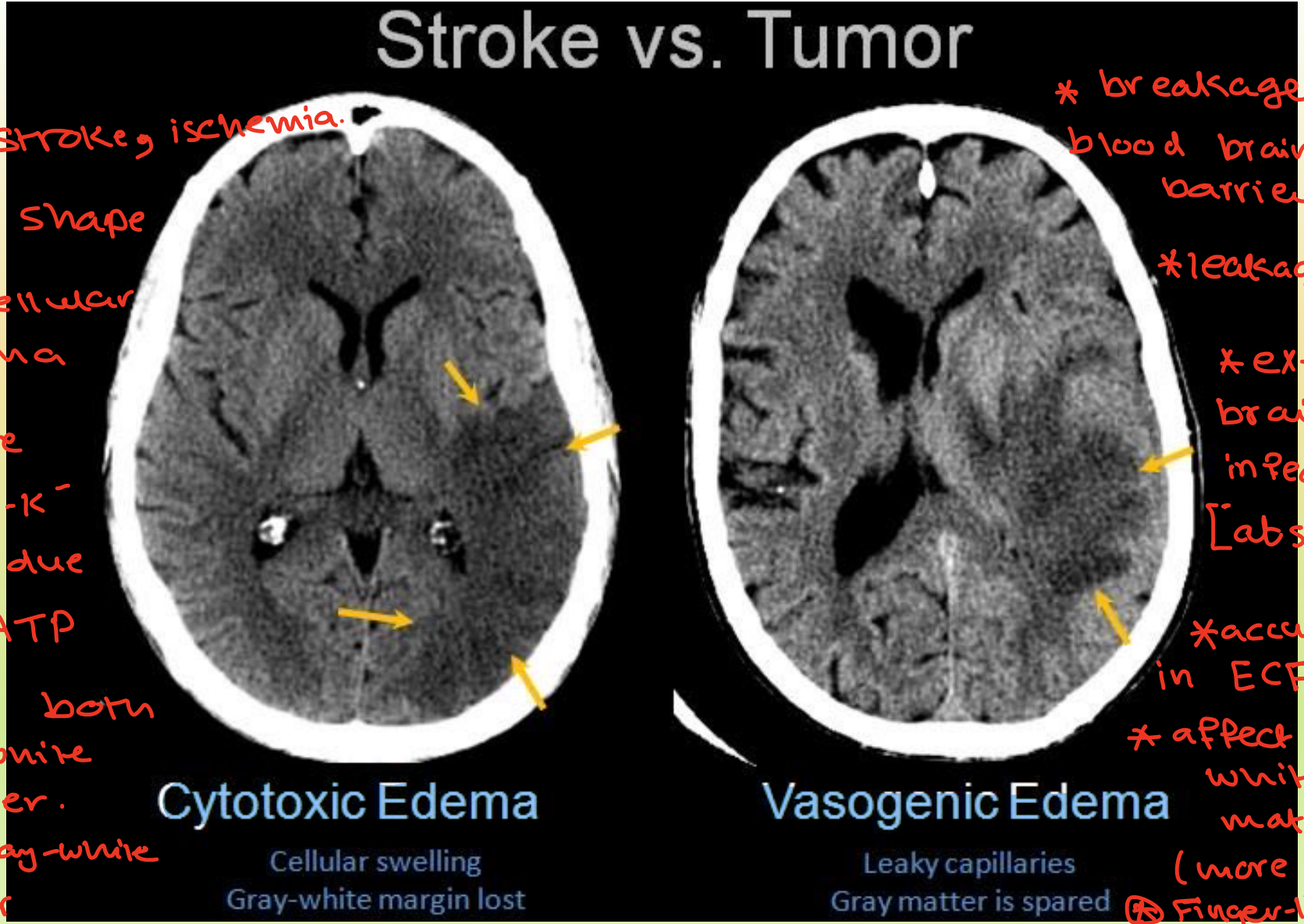
So it treat vasogenic edema thus decreasing the ICP causing by vasogenic edema ,so it's a symptomatic treatment.

-BUT its not ttt for increase ICP itself.

3. interstitial : extracellular due to CSF leakage between cells (main cause is acute hydrocephalus not increase in intracranial pressure)

Sign on CT: CSF seepage ,appear as hypodense in frontal, temporal , occipital bones

* اللي بميز ال edema بشكل عام بغض النظر عن نوعها :- ↑ in the volume



* with stroke, ischemia.

* wedge shape

* intracellular edema

* Faliure of Na^+-K^- pump due to ↓ ATP

* affect both gray-white matter.

[no gray-white matter

* breakage of blood brain barrier.

* leakage.

* ex: brain, infection [abscess].

* accumulate in ECF

* affect white matter.

(more ECF).

* Finger-like

Brain Metastasis

*the most common brain tumor? metastasis
*clinically → GBM

- One or more lesions
- Usually at gray-white matter junction → blood supply
- Generally very poor survival (months) (stagnation of blood) white matter

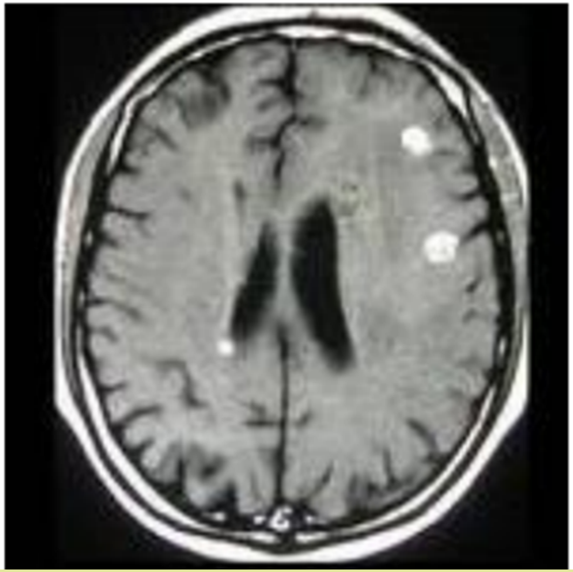
- Good survival predictors: age < 65, limited extracranial disease
- 1-3 lesions can be removed by surgery (>3 is palliative) .
- Can significantly improve prognosis ,followed by radiation.
- Multiple lesions often treated with radiation

- **Note :"The lung is the most common origin of primary tumors that metastasize to the brain.**
- **Melanoma has the highest propensity to metastasize to the brain. Therefore, if you detect melanoma, it is advisable to perform a direct brain CT."**

embryological.

rare melanoma most common lung.

Metastatic Melanoma



Brain Tumors

Adult Tumors

Glioblastoma Multiforme

Oligodendroglioma

Meningioma

Hemangioblastoma

Pituitary Adenoma

Schwannoma

[mainly in Rt and lt hemisphere]

mainly: supratentorium.

Child Tumors

Pilocytic Astrocytoma

Medulloblastoma

Ependymoma

Craniopharyngioma

Pinealoma

[mainly in the posterior Fossa]

Cerebellum, brain steam, 4th ventricle]

(can lead to sudden death) brain steam

موجود * : posterior fossa *

(بعمل مشاكل ↑ volume اي)

حجمها صغير *

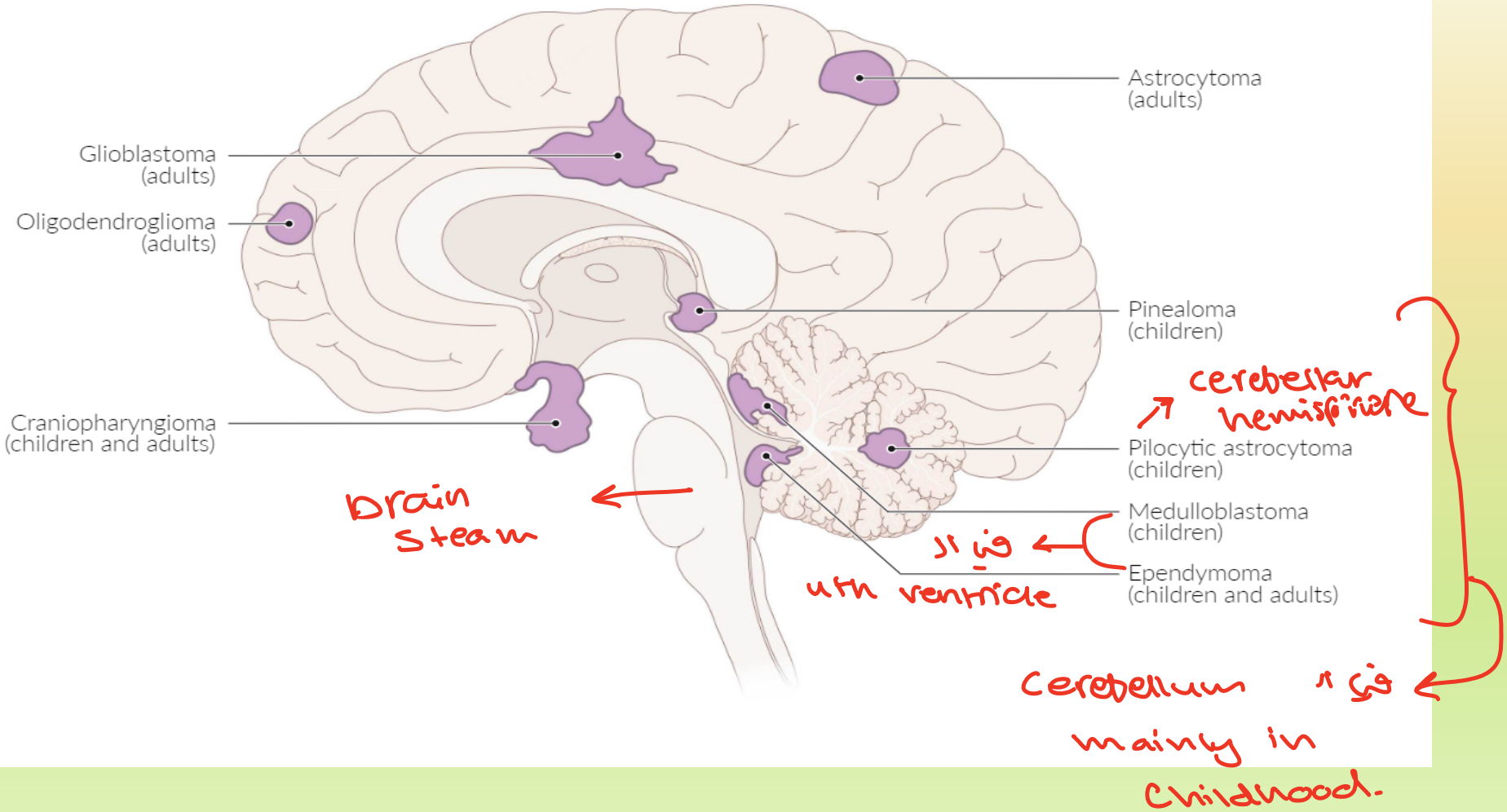
(narrowest part of the CSF flow) cerebral aqueduct

في *

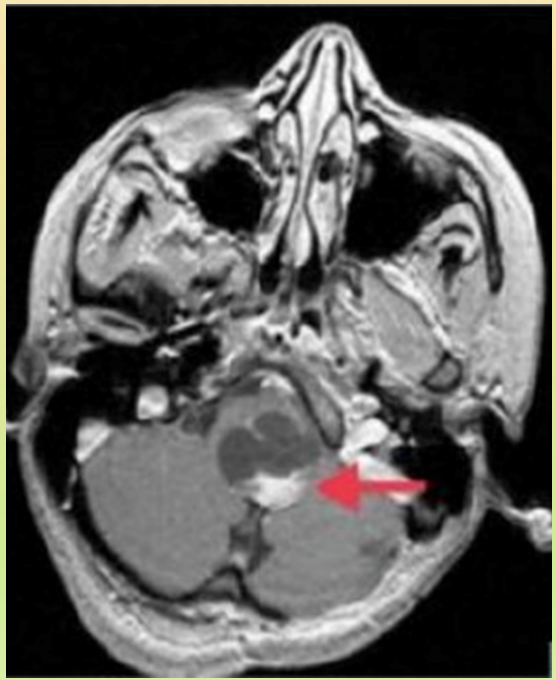
Types of brain tumors by growth characteristics

→ Hydroencephalus ممكن ينتج عنها

	Low-grade brain tumors	High-grade brain tumors
WHO grade	I–II	III–IV
Borders	Well-defined	Poorly-defined
Spreading potential	Low	High
Recurrence	Rare	Frequent


Astrocytoma
(adults)
Glioblastoma
(adults)
Oligodendroglioma
(adults)
Pinealoma
(children)
Craniopharyngioma
(children and adults)
Pilocytic astrocytoma
(children)
Medulloblastoma
(children)
Ependymoma
(children and adults)
cerebellar hemisphere
Brain stem
4th ventricle
Cerebellum
mainly in childhood.

Pilocytic astrocytoma



cerebellum ll *

ipsilateral ↵

- Most common benign primary brain tumor in childhood, Astrocyte origin
- Low-grade astrocytoma(WHO grade 1)
- It has a good prognosis.

Histologically:

- • Pilocytic: fiber-like cells
- • Usually in posterior fossa (cerebellum)
- • Presents with cerebellar dysfunction: ataxia
- • Usually slow-growing, well-defined circumscribed
- • Often successfully treated with surgery
- • Cure rates of 90 to 95%

Pilocytic astrocytoma

- Even the tumor is benign and has good prognosis but it has a mass effect and we should resect it .
- Pilocytic astrocytoma has solid (called a mural nodule “in the wall”) and cystic component .

- MRI head (a: T1-weighted; with contrast; sagittal plane; b: T2-weighted; axial plane) of a child

- A large lesion in the right cerebellar hemisphere displaces the vermis to the left of midline. It has a large cystic component (T1 hypointense and T2 hyperintense; red overlay) and a heterogeneously enhancing solid nodular component (green overlay)

*دايماً بدي T1 مع contrast.

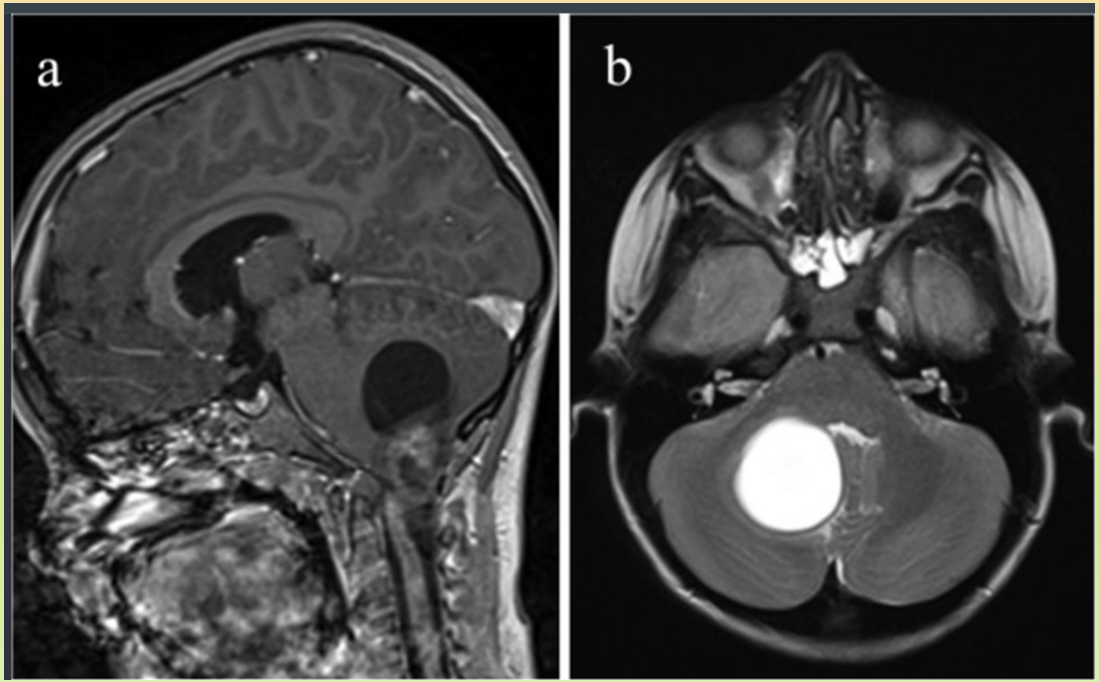
A: sagittal T1 contrast enhanced MRI showing cerebellar cystic lesion with a mural nodule

B:Axial T2 contrast enhanced MRI showing a hyperintense lesion in the right cerebellar region

- Treatment: Often successfully treated with surgery

No need for post op chemotherapy

- Cure rates of 90 to 95%

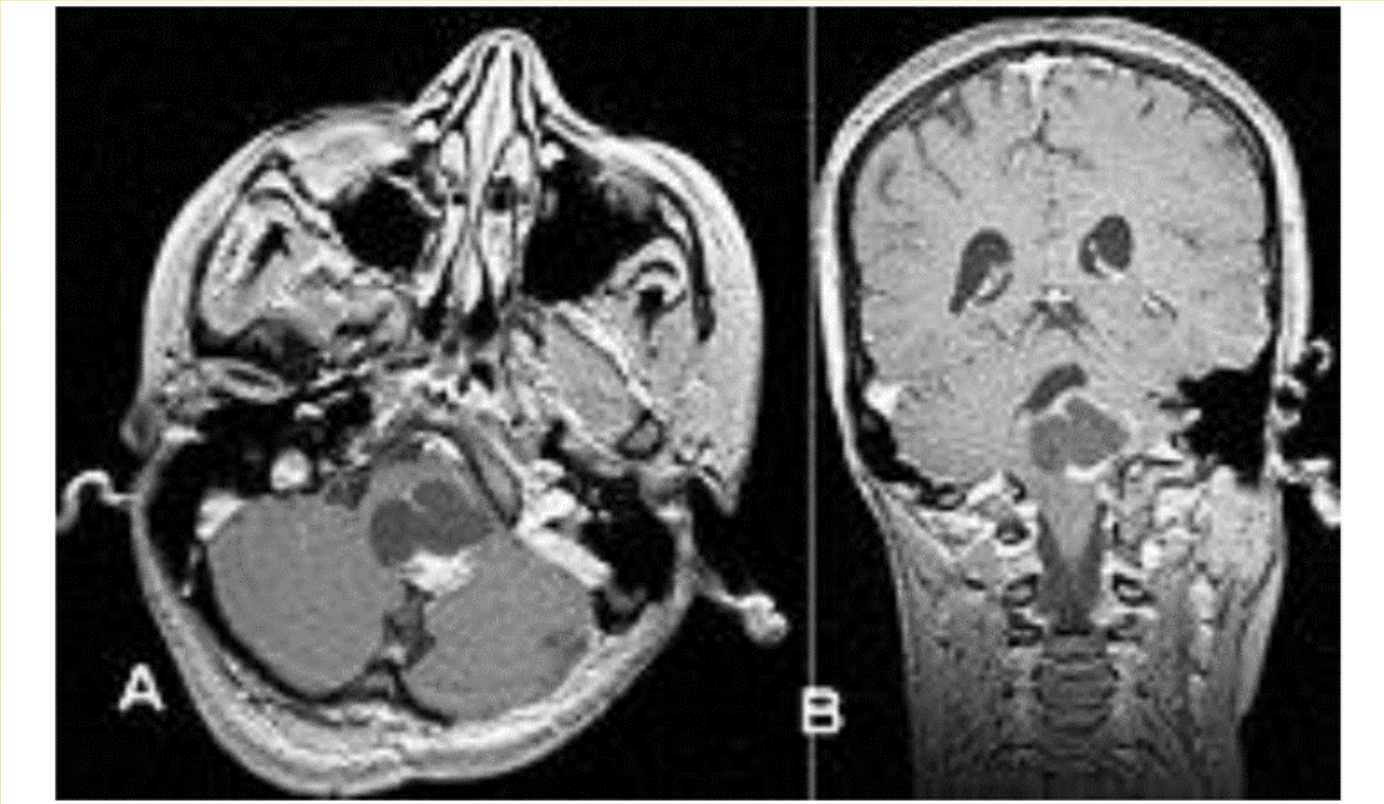


*cystic lesion

-mural nodule وعلى حوافها

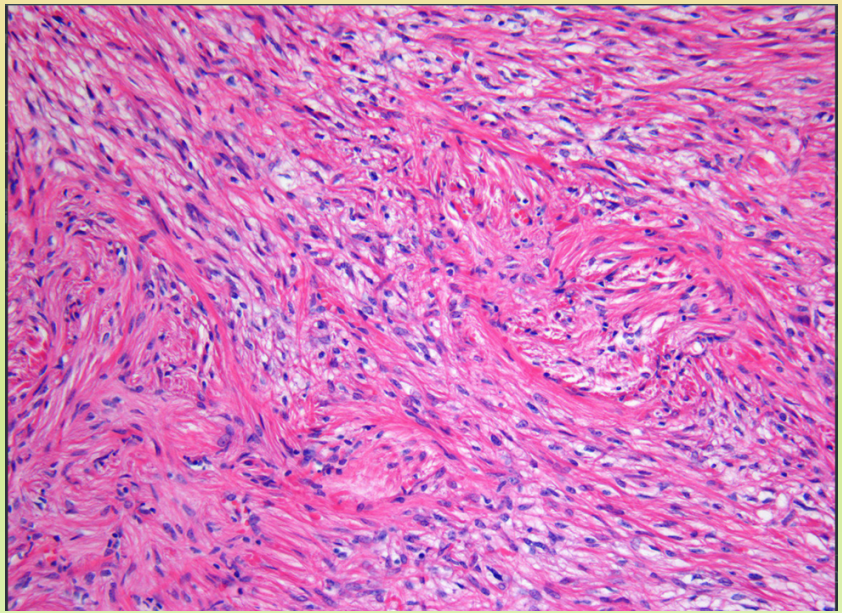
B:Coronal T1 contrast enhanced MRI showing ring enhancement

A:Axial T1 Contrast enhanced MRI showing a hyperintense mural nodule



Rosenthal fibers

- The bright red-pink bodies in astrocytes and indicate intense gliosis.



Medulloblastoma

*original cell → primitive neural cell.

↗ posterior part (base → anterior)

- Originates from the roof of the 4th ventricle

* يعمل metastasis عن طريق : (drop metastasis) . CSF

Most common childhood **malignant** brain tumor

- Usually occurs in children
- Associated conditions:- **Turcot syndrome (Brain tumor-polyposis syndrome)**
- Usually occurs in cerebellum
- Often midline causing Truncal ataxia

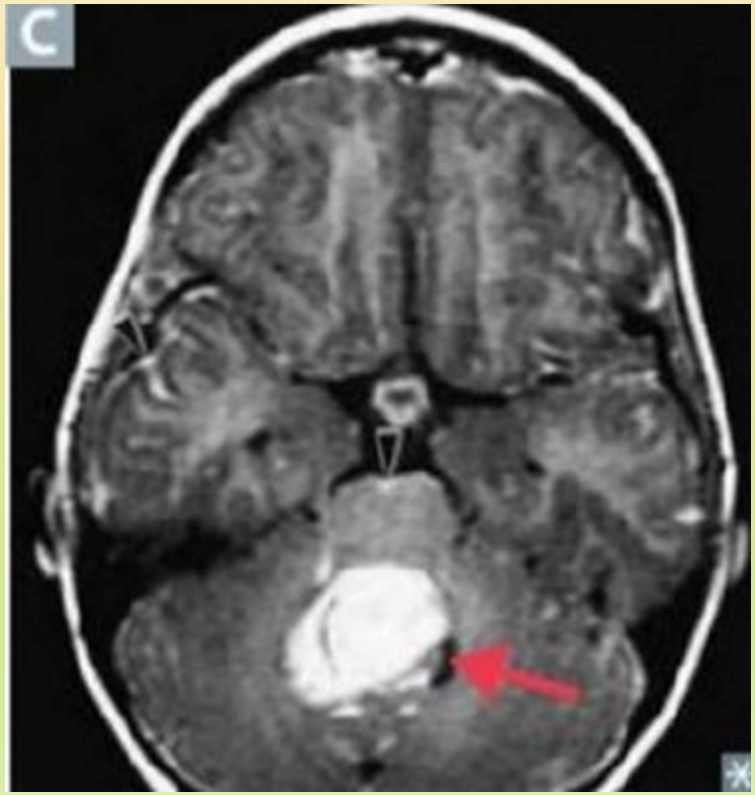
Truncal ataxia :A lack of coordination of voluntary movements that primarily affects the central body. Most commonly presents with an inability to sit upright and/or stand without support.

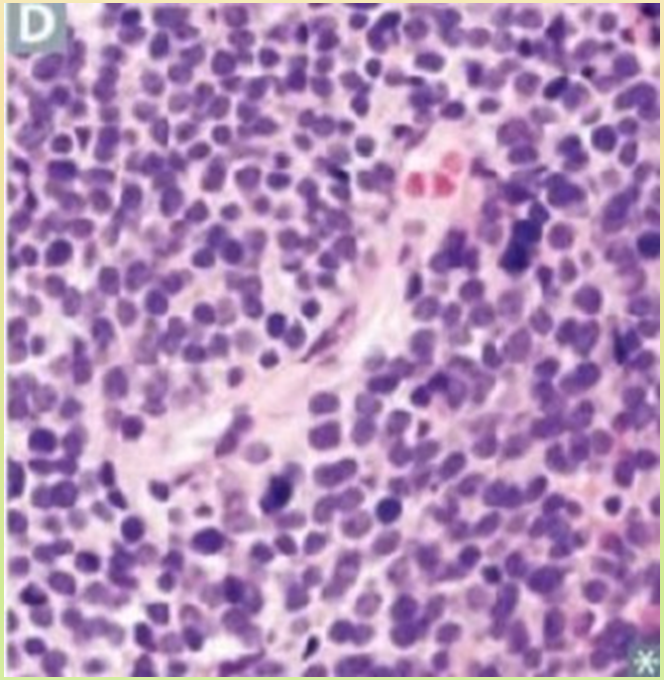
* لازم اذا اجانا خلل عنده Headache ، تنخرج على عيونه لو في حوَل. (squint)

. brain tumor ممكن يكون عنده squint اذا في

Homer-Wright rosettes

احتك الوردي

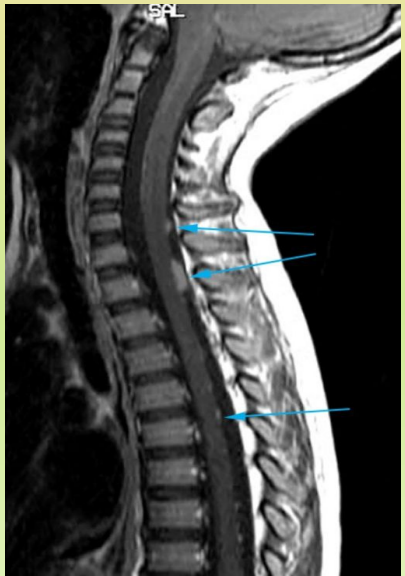


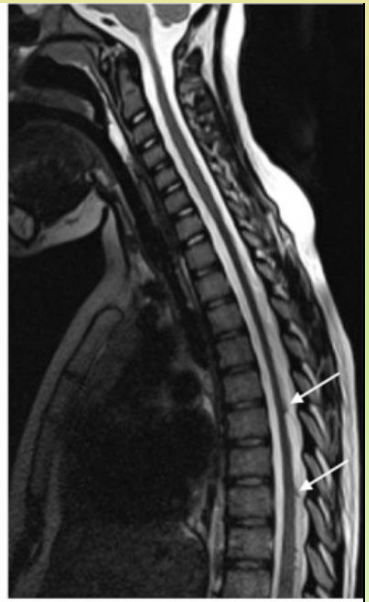


- Can compress 4th ventricle → Non-communicating hydrocephalus
- Symptoms of ↑ ICP: Headache, nausea, vomiting
- Can spread to CSF causing **DROP METASTASIS** Paraplegia

From 4th ventricle to the spine.

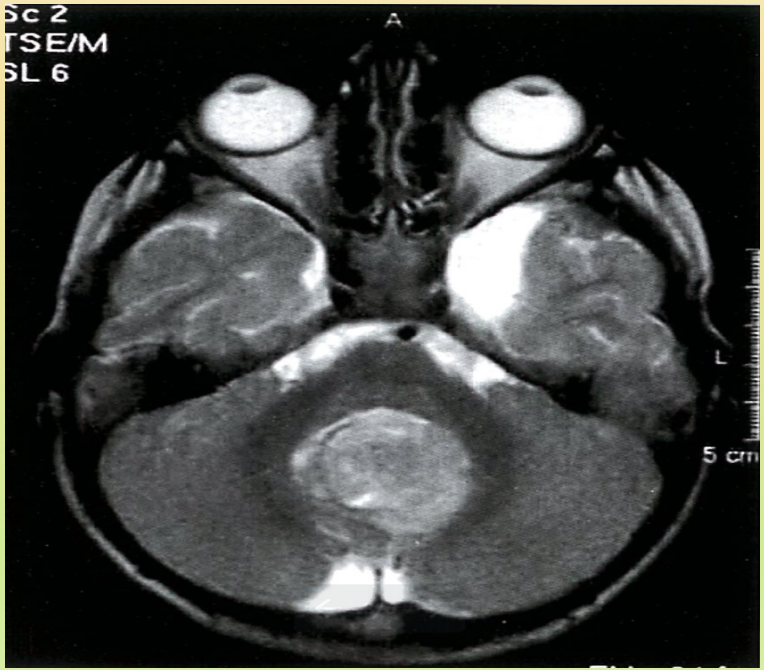
- Drop metastasis :The metastasis of a primary central nervous system (CNS) neoplasm inferiorly, typically **via cerebrospinal fluid (CSF).** Typically presents as nodules along the spine and cauda equina that can cause back pain with neurologic symptoms (e.g., limb weakness). Can be detected by lumbar puncture.
- ON MRI T1 contrast enhanced : **sugar coating**

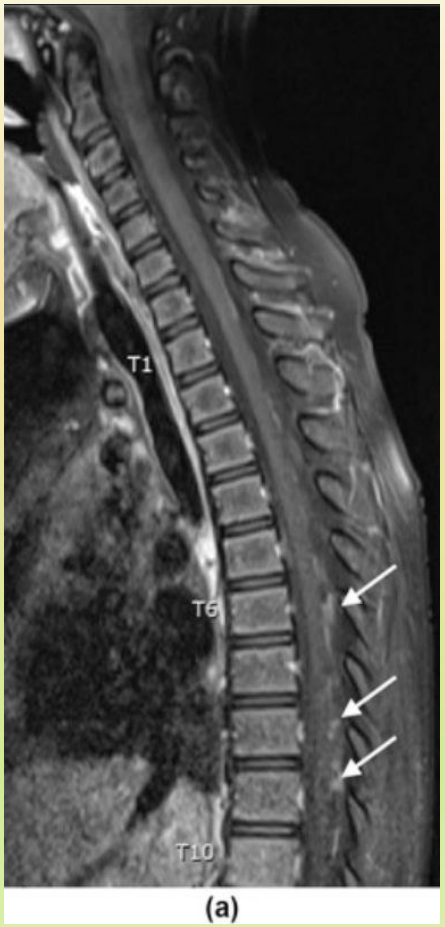




Medulloblastoma: most common pediatric CNS malignant tumor.

- Treatment: surgery, radiation, chemo
- 75% children survive to adulthood



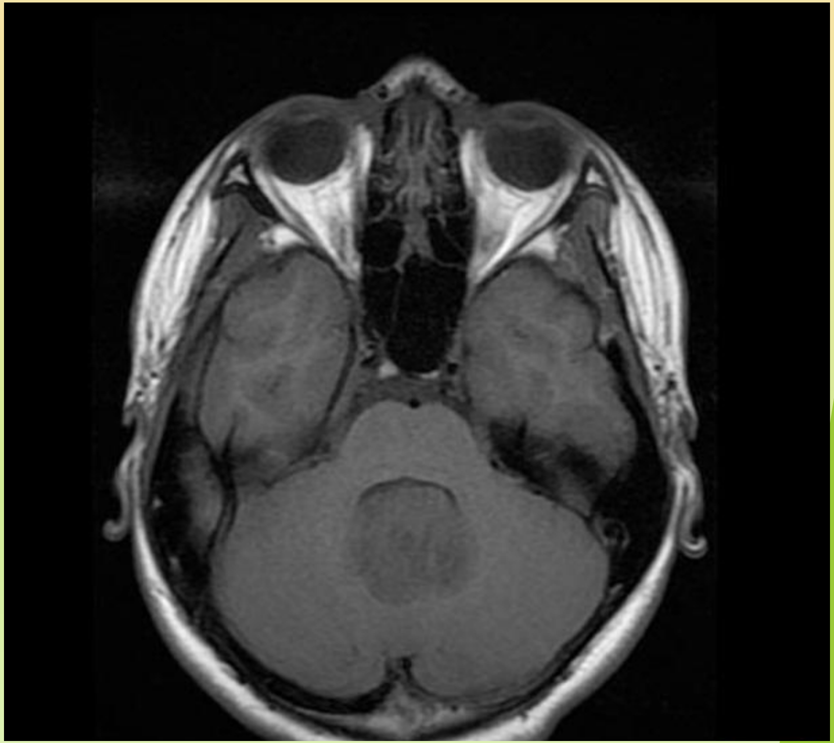


- T2-weighted cranial MRI (axial view) of a 7-year-old boy with medulloblastoma
- A lobulated heterogeneous mass in the midline at the level of the fourth ventricle shows intermediate-to-high T2 signal.
- ON CT (or MRI) : banana sign

← بيعبي ال 4th ventricle كامل

باستثناء ال anterior part.

(هو جاي من ال posterior.



*benign mainly

بكلا .

(brain steam /anterior)

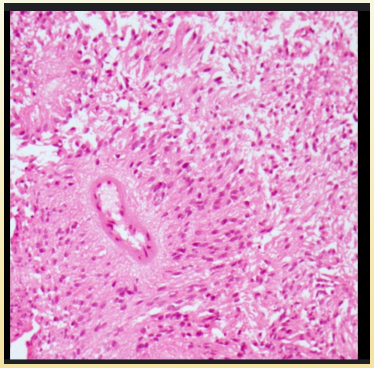
Ependymoma

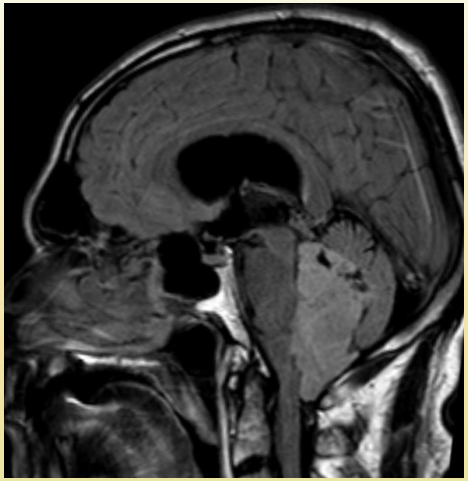
- Ependymoma originates from the **base** of the 4th ventricle .
- Arises from ependymal cells of the ventricular system.
- Associated conditions: **neurofibromatosis type II .**
- Clinical features: 4th ventricle is the most common location in children → noncommunicating hydrocephalus → features of increased intracranial pressure (e.g., papilledema, headache)
- Imaging: intra-parenchymal tumor with calcifications and cystic components .
- Both medullo and ependymoma intraventricular within 4th ventricle . Both cause obstructive hydrocephalus .
- Less likely to cause mets in contrast with medulloblastoma that cause drop mets.
- The expansion to ependymoma usually like to exist and inter foramen of luschka and magendie while medullo not likely to see this expansion with it.

pseudorosettes

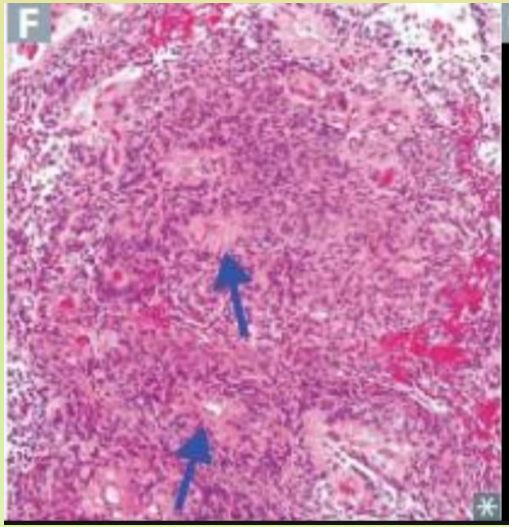
Histology :

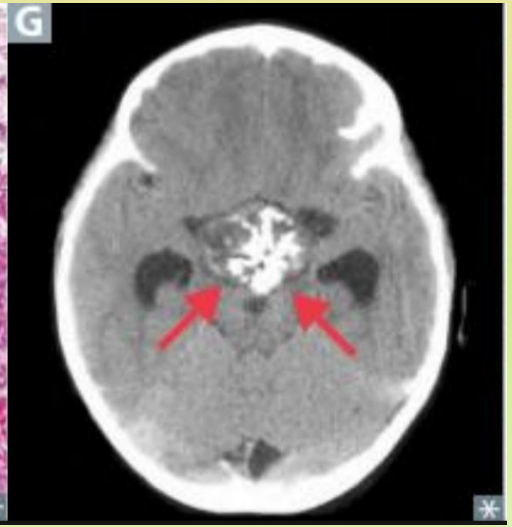
- Ependymal cell origin.
- **Characteristic perivascular pseudorosettes .**
- Rod-shaped blepharoplasts (basal ciliary bodies) found near the nucleus.





- Prognosis :usually poor
- Treatment : surgery and radiation





rod-shaped blepharoplasts.

- Cranial MRI (FLAIR-sequence, sagittal view)

- A hyperintense, heterogeneous, extended mass is visible on the roof of the 4th ventricle .At the superior aspect of the tumor, multiple cysts are present .As a result of an obstructed circulation of the cerebrospinal fluid, the 3rd ventricle appears widened

Craniopharyngioma

* From pituitary [sella turcica]

(posterior Fossa) optic nerve

* de compression

- Craniopharyngiomas are approximately equally common in males and females. There is a bimodal age distribution, with one peak in children between 5 and 14 years old and a second peak in adults between 50 and 75 years of age.

* supracellar

- There are two types of craniopharyngioma:
  * **adamantinomatous craniopharyngioma** for pediatrics and → most common of supratentorium
  * **papillary craniopharyngioma** for adult .

Pediatric type :

- Most common childhood supratentorial tumor.
- Craniopharyngiomas usually arise along the pituitary stalk in the suprasellar region adjacent to the optic chiasm .

↳ so compression on the optic nerve.

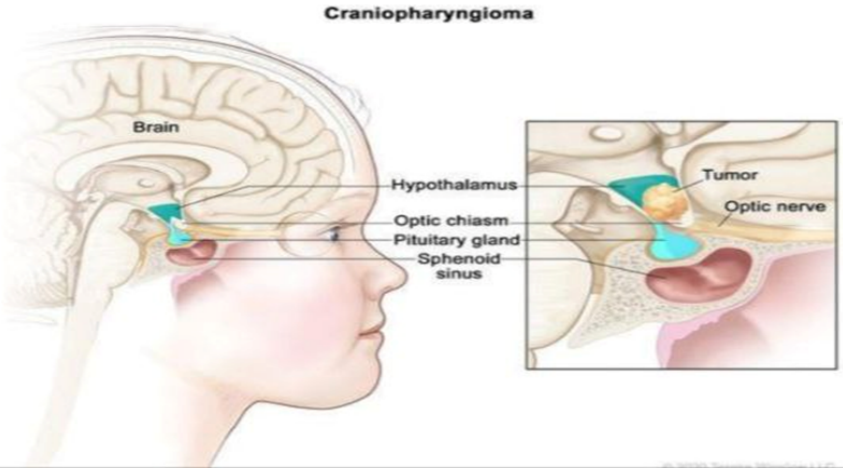
- Compression of the pituitary gland due to intrasellar extension (stalk effect) → hypopituitarism
- Hypogonadotropic hypogonadism
- Failure to thrive.
- Central diabetes insipidus.
- Compression of the infundibular stalk → disconnection hyperprolactinemia
- Compression of the optic chiasm → bitemporal hemianopsia(visual fields are lost in outer portion of both eyes in temporal field)

dopamin inhibitory

(هو لوحده اللي بزيد ، بنعطل inhibition of the inhibition)

Craniopharygioma

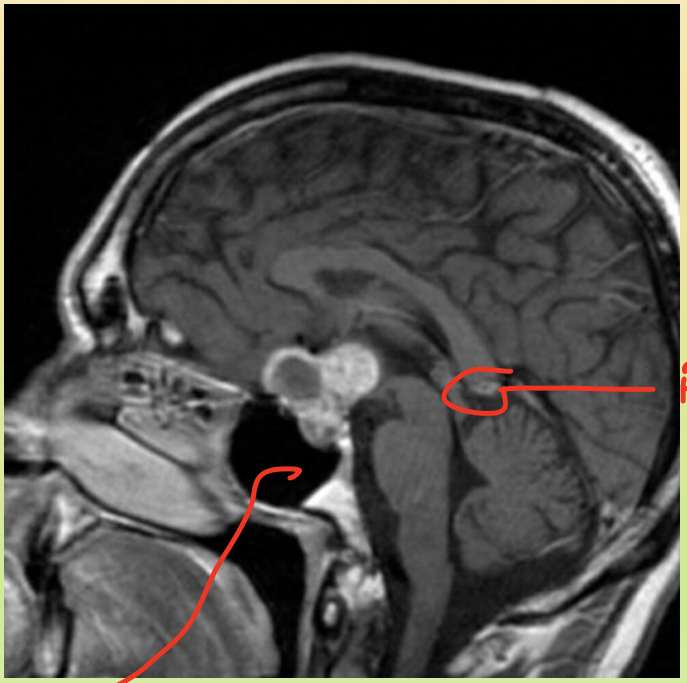
- **Origin:** Remnants of Rathke's pouch (embryological origin of pituitary gland in the roof of the pharynx)
- **Pt.:** usually child between 5-10 ys
- **Site:** In the diencephalon
- **Mass:**
  - ❖ Solid component → Tumor cells
  - ❖ Cystic component → Brownish fluid containing cholesterol crystals
  - ❖ Calcific component → Calcified like bone (appear on x ray)
- **Features:**
  1. Panhypopituitarism → due to pituitary compression
  2. Hyperprolactinemia → due to pituitary stalk compression
  3. Headache & visual field defects – Bitemporal hemianopsia



* with contrast

MRI head (T1 weighted; with contrast; sagittal plane) of a patient with acute visual loss in the right eye

There is an intrasellar and suprasellar mass with both cystic and solid portions. The solid portions show strong contrast enhancement.



. sella turcica : فوقها على طول

Pinealoma ✓ pineal region

- Pineal gland :A gland located along the midline on the dorsal surface of the midbrain. Secretes melatonin and plays a role in the control of circadian rhythm.
- Pinealoma : Most commonly extragonadal germ cell tumors. ↑ incidence in males.

- a tumor that forms in or near the pineal gland, and also called third eye tumor.

- Occur in children 1 to 12 years old
- They are often germ cell tumors (extra-gonadal tumors)

Clinical features and treatment

- Compression of dorsal midbrain leads to:
- Compression of tectum(important for coordinating upward gaze) → vertical gaze palsy (Parinaud syndrome)→ sunset eyes جزء منها
- Compression of cerebral aqueduct → noncommunicating hydrocephalus
- Compression of hypothalamic inhibiting pathways → increased hCG secretion → precocious puberty

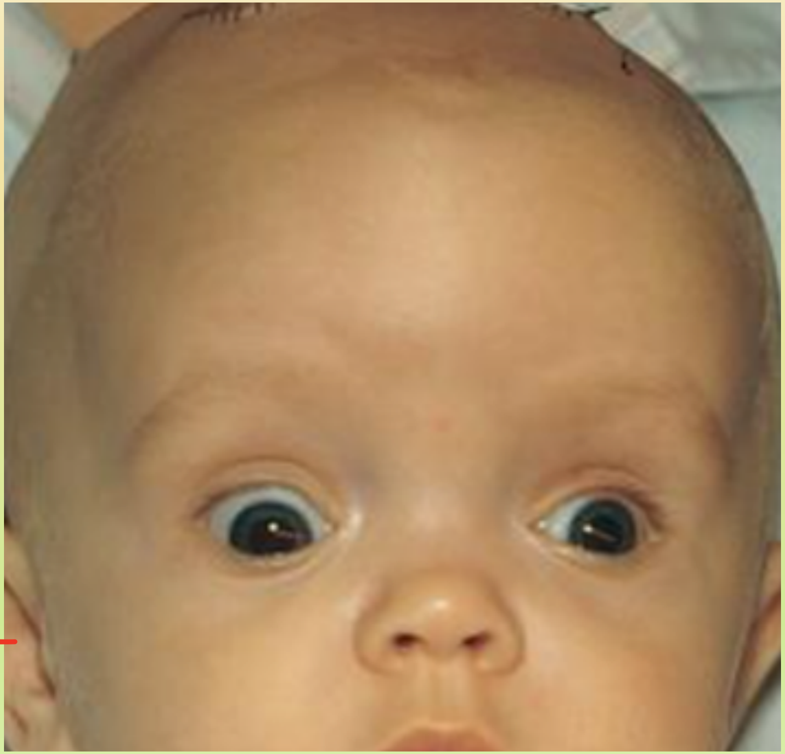
- Histology :Approx. 70% are germinomas (similar appearance to testicular seminoma)
- **Highly responsive to radiation therapy .**
- Survival rates > 90% in localized cases .

Parinaud syndrome:

(compression of dorsal midbrain)– triad of upward gaze palsy, convergence-retraction nystagmus, and light-near dissociation. (Pseudo-Argyll-Robertson pupils: react to accommodation but not light.)

دخيوركس يرفع عينه لفوق .

→ مابستجيب لل light, only to near response



Adult tumors

*in clinical → [in abscess, metastisis]

studies, the most common tumor.

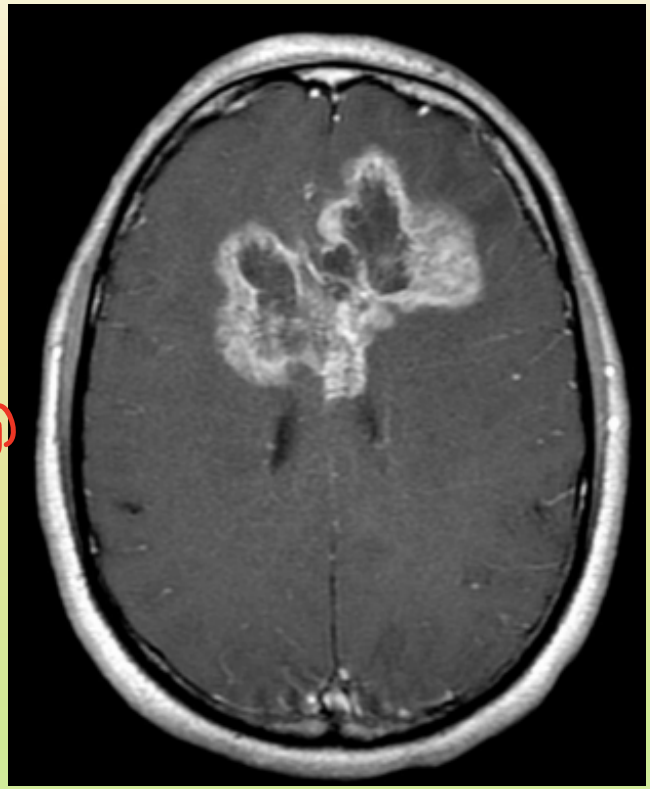
Glioblastoma

*ring enhancing lesion

necrosis لـ بالوسط في

enhancement ← periphery وفي .

- **Most common primary brain tumor in adults**
- Derives from astrocytes
- Occurs in cerebral cortex
- **Butterfly appearance on MRI** (butterflying في specific)
  - Tumor spanning corpus callosum
- Rapidly progressive
- Usually fatal < 1 year • Half of patients > 65 years old
- Older age = worse prognosis



* T1.

* gliomas بشكل عام

تنتشر عن طريق white matter.

* ring - enhancing lesion.

*bad prognosis.

- GBM : Grade 4
- highly vascularized , necrotic because of high mitotic index ,so blood supply isn't enough for all the cells .

- On MRI ring enhancing lesion .
- Buttery appearance on MRI (only occur late
- Gliomas are infiltrate with axons
- Corpus callosum connect right with left hemisphere
- Hallmark for GBM IS on MRI is ring enhancement
- The gold standard modality for brain tumours is MRI

*ring enhancement:

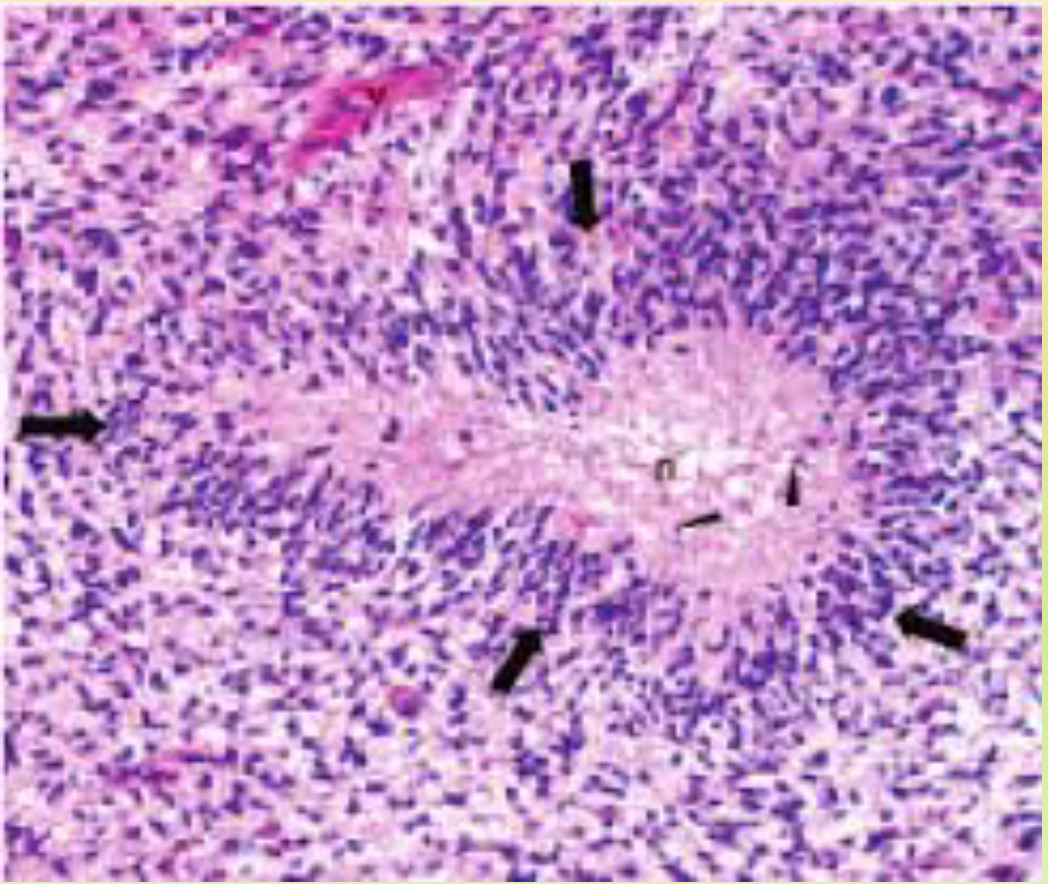
abscess

glioblastoma

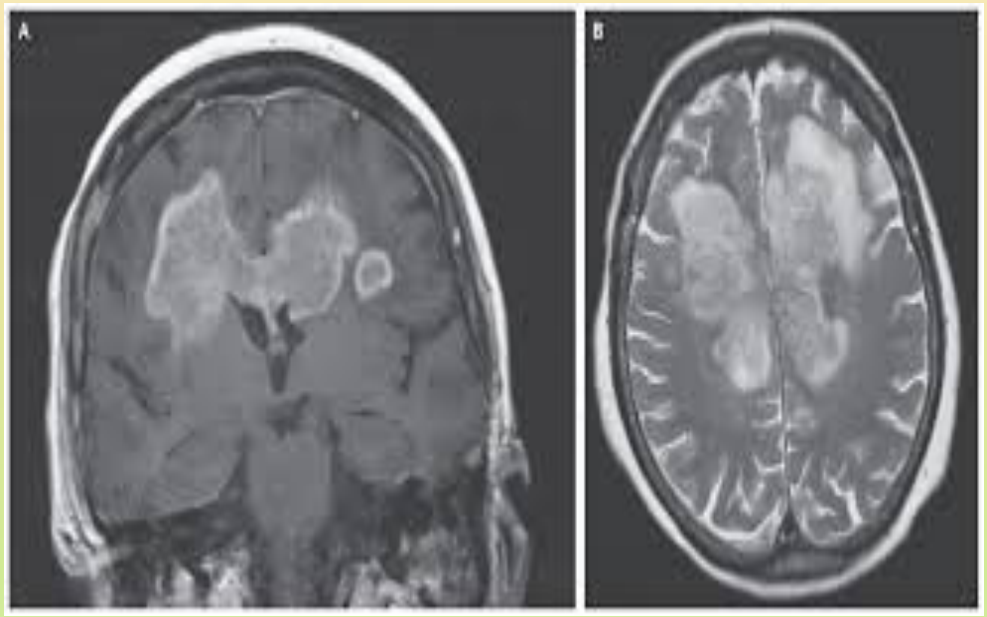
metastisis

Pseudopalisading

اصطفاف



butterfly glioma



Histopathology

دهيطخاف

- “ Pseudopalisading” cancer cells typically recruit BV to provide nourishment in a process called angiogensis , but gliobalstoma proliferates so fast that even with angiogensis the neuitrient demand outpaces blood supply , as a result because the blood supply serves peripheral tumor cells first , the tumor cells in the center die first because the are the furthest from blood supply , the remaining viable tumor collect along edges of necrotic region (neucli are lining up on the edges because they are being pushed out from something in the middle which is the necotic cells)

Glioblastoma

- Diagnosis : Neurologic exam , imaging test , biobsy

- Treatment :
- • Surgical resection
- Neoadjuvant (pre-surgery) radiation
- **Temozolomide** → (radiotherapy).
- Oral alkylating agent
- Given daily during radiation
- Followed by post-radiation cycles

Meningioma

(2nd most common in adult).

First incidental finding

*anatomically → originate From dura.

. GBM is ↘

A meningioma is a tumor that arises from the meninges (the membranes that surround your brain and spinal cord). Although not technically a brain tumor, it is included in this category because it may compress or squeeze the adjacent brain, nerves and vessels.

- Second most common brain tumor in adults
  - From arachnoid cells (cap cells)
- Forms along dura
- "Extra-axial" - external to brain
- Can have dural attachment ("tail")
  - Usually benign (no metastasis) and resectable
  - Treatment: observation or surgical resection

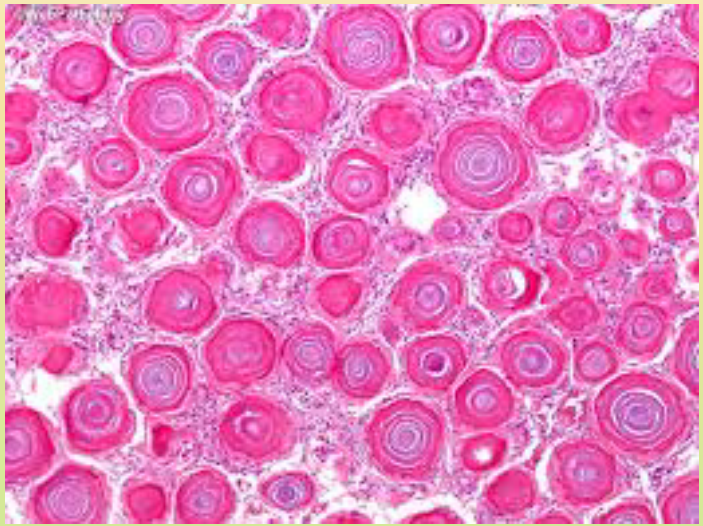
meningioma

- Often asymptomatic, typically benign
- Tissue compression can cause focal defects or seizures
- Classically affects female more than males
    - Expresses estrogen receptors
- Prior radiation to head is risk factor
    - Childhood malignancies
    - Latency period ~20 years

Meningioma

Histology:

- Psammoma bodies (laminated calcifications)
- Spindle cells concentrically arranged in whorled pattern.



*dura mater:

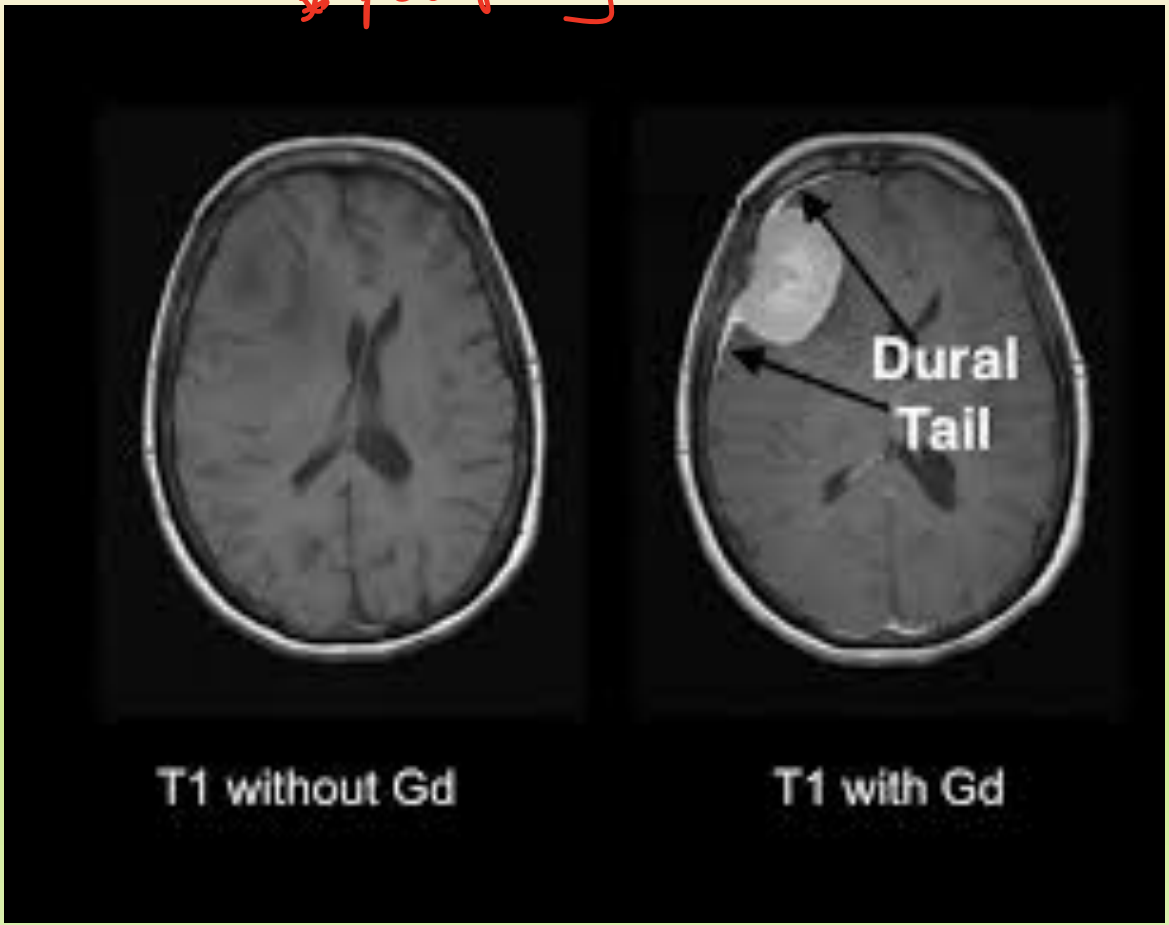
*tentorium

Meningioma

* Falx
* base of skull
* periphery

- CT scan :
- Extra-axial (external to brain parenchyma) so can attach to dura and have this " tail" of thickened dura from the meningioma cells.

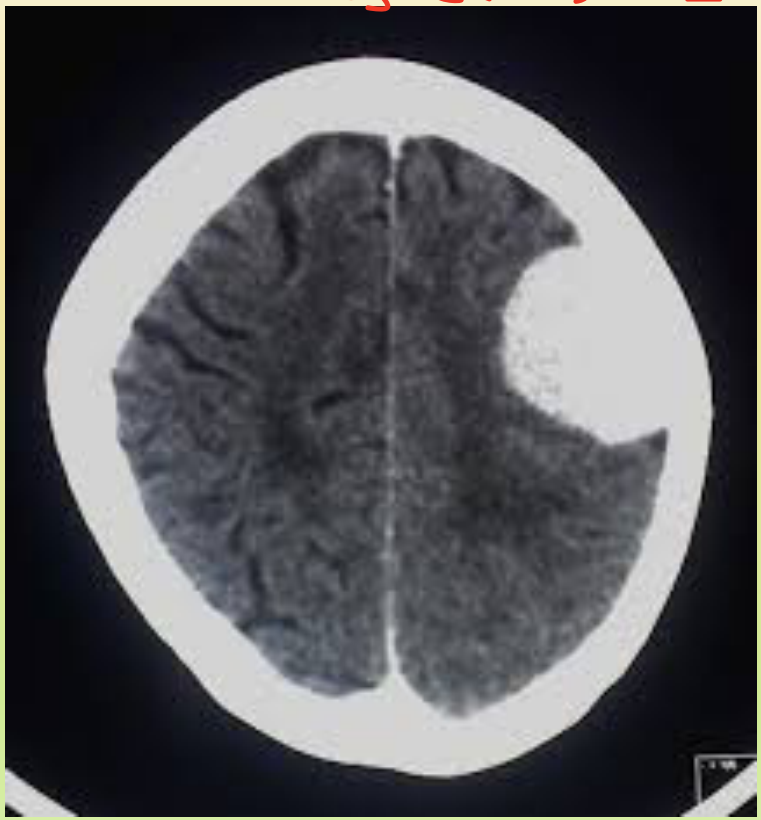
* خارج من الـ dura وحاطط
. brain على الـ compression



Meningioma

* كيف بميزه CT عن MRI ؟
عن طريق bone في CT ابيض .
MRI اسود .

- Characteristic of meningioma on CT scan : it appears on the outside pushing its way in, no little fingers of growth diving into the cortex because it is extra-axial.
- Treatment : Because most meningiomas grow slowly, often without any significant signs and symptoms, they do not always require immediate treatment and may be monitored over time.



* عبارة عن dura ، Falx ، tentorium ، periphery يمكن تطوره

- Meningioma's come from arachnoid cap cells
- Appear on MRI as Dural tail + vivid enhancement (on T1 with contrast)
- axial T1 without contrast
- Dural tail : mean that there is expansion
- On MRI without contrast meningioma appears as iso-intense on both T1 and T2
- If you found blood vessels are hyper-intense , then this is with contrast
- CT with contrast because sagittal sinus is enhanced
- Note: meningioma is highly vascular
- Note: in digital substraction angiography (DSA) , what is substracted is the bone
- Note: meningioma on DSA , mother in law sign (as you give contrast , when it comes out of the vessel it vanishes, comes early goes late
- Meningioma : (grade1)

Schwannoma

extra-axial

- third most common adult primary brain tumor
- Derives from Schwann cells of PNS
- Classically at cerebellopontine angle involving both CN 7 and 8, but can be along any periphral nerve . Often localized to CN 8 in internal acoustic meatus , leading to vestibular schwannoma that presents as:

[CN , 7, 8, 5]

mainly

  - ✓ Cochlear nerve lesions: hearing loss, tinnitus
  - ✓ Vestibular nerve lesions: ataxia, rarely vertigo

sensory

vestibular نم *

internal acoustic meatus

- Rarely compresses trigeminal (V) or facial (VII) nerves

  Facial paralysis or paresthesias

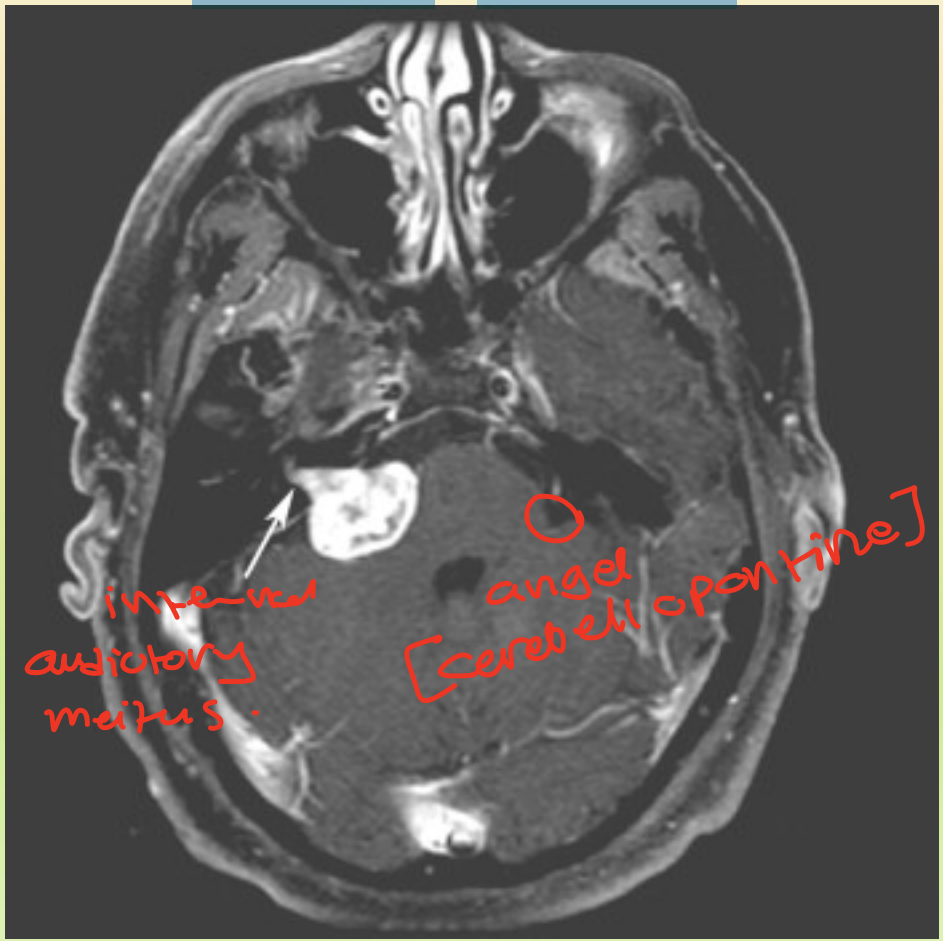
- Treatable with surgery for resection and radiation

- Internal acoustic meatus is a ring neuro-vascular bundle passes from it CN7 (UP) and CN8 , divided into vestibular and cochlear

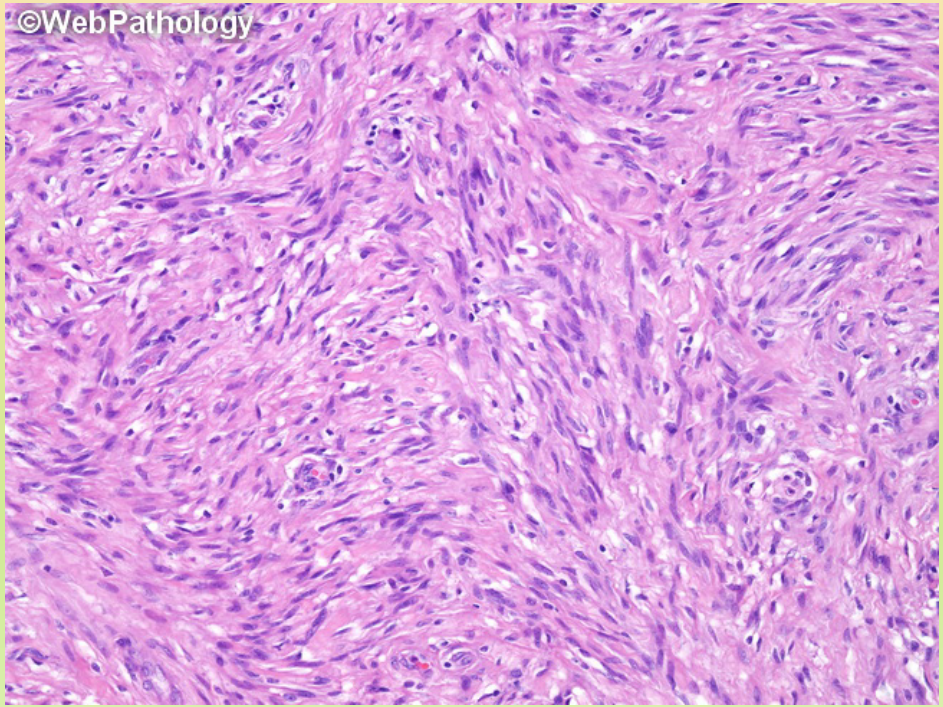
- Facial palsy is always late presentation of schwannoma
- Note : sensory effect of any nerve Is affected sooner than motor.
- Labyrinthine artery moves with this neurovascular bundle

- Shwanomma: (grade 1)
- Most common schwannoma is vestibular schwannoma
- CN5,CN7,CN8: are bundle nerves , schwannoma comes out of them .

Histology : dense , hypercellular areas containing spindle cells alternating with hypocellular , myxoid areas



vestibular schwannoma



Neurofibromatosis →

غالباً يجي معها bilateral schwannomas.

Type 2 (less common)is ass/w :

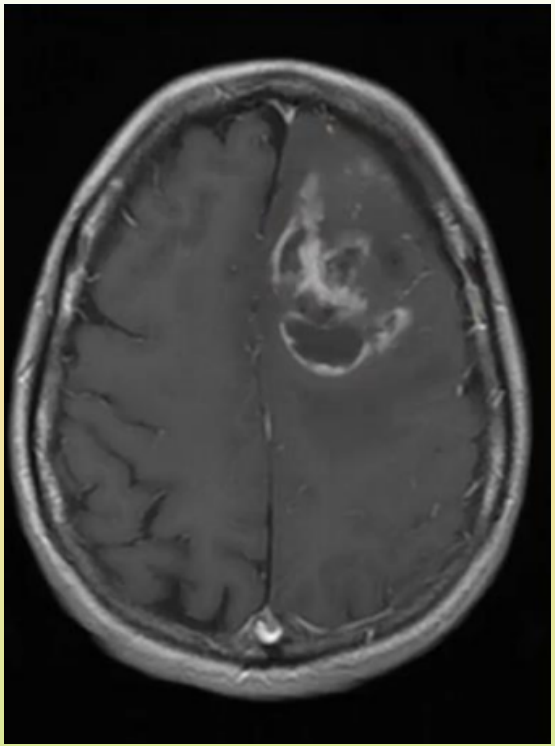
- **Bilateral schwannomas:** almost all patients with Neurofibromatosis develop Bilateral schwannomas.

- Many patients also develop **Meningioma.**

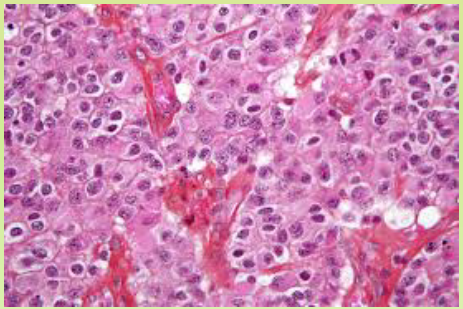
- Neurofibromas
- Lisch nodules
- Café-au-lait spots

- Neurofibromatosis type2
- Lisch nodules :hamartoma in iris
- Note: schwannomas are typically benign tumours that occur sporadically in neurofibromatosis type2 or in an intially called schwannomatosis
- If NF2 is pathognomonic for bilateral schwannoma

Oligodendroglioma



- Rare, slow-growing tumors of oligodendrocytes
- **Most patients 25 to 45 years old**
- White matter of the cerebral hemispheres
- Usually in frontal lobe
- Most common presenting symptom: **seizure**
- Contrast with glioblastoma
- Older patient
- Fast growing
- Worse prognosis
- Histology :“ Fried egg” “ Chicken-wire
  “ capillary pattern



- Oligodendroglioma most common location prefrontal cortex

ممكن نخلط على اي اسئلة و نقول كل اسئلة ماعدا mass effect

و ممكن يأثر على ال prolactine و optic chiasm.

Pituitary Adenoma

anterior pituitory mainly

- Formed by hormone secreting cells of anterior pituitary , may be nonfunctioning or hyperfunctioning .
- classified by the hormone that is released as tumor forms, and by size of tumor .
- The non-functioning type 1.presents with mass effect (like : bitemporal hemianopia , due to pressure on optic chiasm you can't see in the outer portion of both your eyes.)
- 2.Pituitary apoplexy is characterized by a sudden onset of headache, visual symptoms, altered mental status, and hormonal dysfunction due to acute hemorrhage or infarction of a pituitary gland.

necrosis / hemorrhage.

- 3. Hypopituitrism

- Optic chiasm is anterior superior to pituitary
- Temporal hemianopia can be seen in suprasellary (craniopharyngioma) or in intrasellary tumours (pituitary adenoma)

* prolactinoma → most common Functioning pituitary adenoma.
T: medical → dopamin agonist.

Pituitary adenoma can be classified as;

- Functional or non-functional → mainly mass effect (mainly macroadenoma)
- Or based on the secreted hormone
- Also can be classified according to the size : into micro or macroadenoma < 1 cm > 1 cm

Microadenoma	Macroadenoma	
Less than 1 cm	More than 1 cm	Size
Present with hormonal symptoms	Present with visual symptoms	Presentation

Note:

If there is hormonal symptoms patients will come earlier (endocrine presentation mainly prolactin)

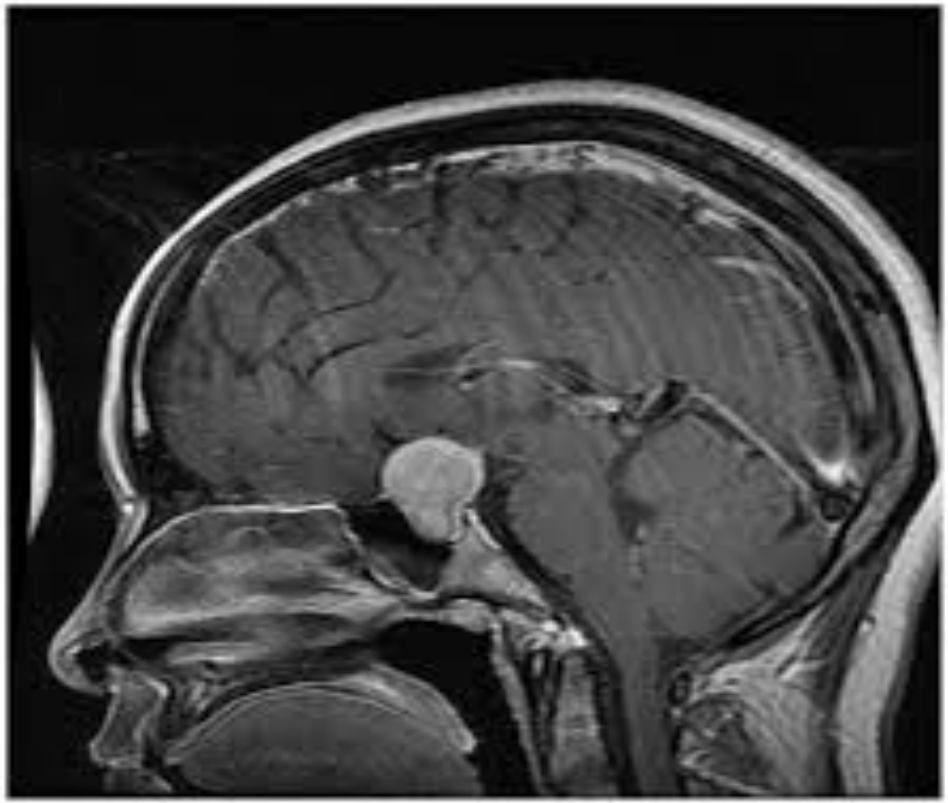
↳ (in Funational type)

mass effect * ما بتوقلك diagnosis

* So mainly microadenoma.

Pituitary Adenoma

- Hyperplasia of only one type of endocrine cells found in pituitary , most commonly form lactotrophes , causes hyperprolactinemia present at galactorrhea, amenorrhea , decrease in bone density , decreased libido and infertility in men.
- Somatotrophes : acromegaly , gigantism. growth hormone.
- Corticotrophins : Cushing disease
- Rarely from thyrotrophes and gonadotrophes
- •< 10mm = microadenoma
- •> 10mm = macroadenoma



Treatment

* most common → hyperprolactinemia,

- There are three types of treatment used for pituitary tumors:
- **surgical removal of the tumor**
- radiation therapy using high-dose x-rays to kill tumor cells
- medication therapy to shrink or eradicate the tumor.

Surgical approach

- The transsphenoidal approach involves accessing the tumor through the nasal cavity using either a microsurgical or endoscopic approach, whichever the surgeon prefers. Surgery is usually combined with the use of computer guidance, allowing a minimally invasive approach.
- Transsphenoidal surgery is invariably the procedure of choice in small "functional" adenomas and in most macroadenomas, with the exception of prolactinomas. In prolactinomas (prolactin hormone-secreting microadenomas or macroadenomas), the use of a specific dopamine agonist medication is generally advised with surgery reserved for those tumors failing to show a good response to the treatment.
- Transsphenoidal surgery is generally very well tolerated because of its minimally invasive characteristic, few side effects and quick patient recovery. Patients can often leave the hospital as early as two to three days after surgery.

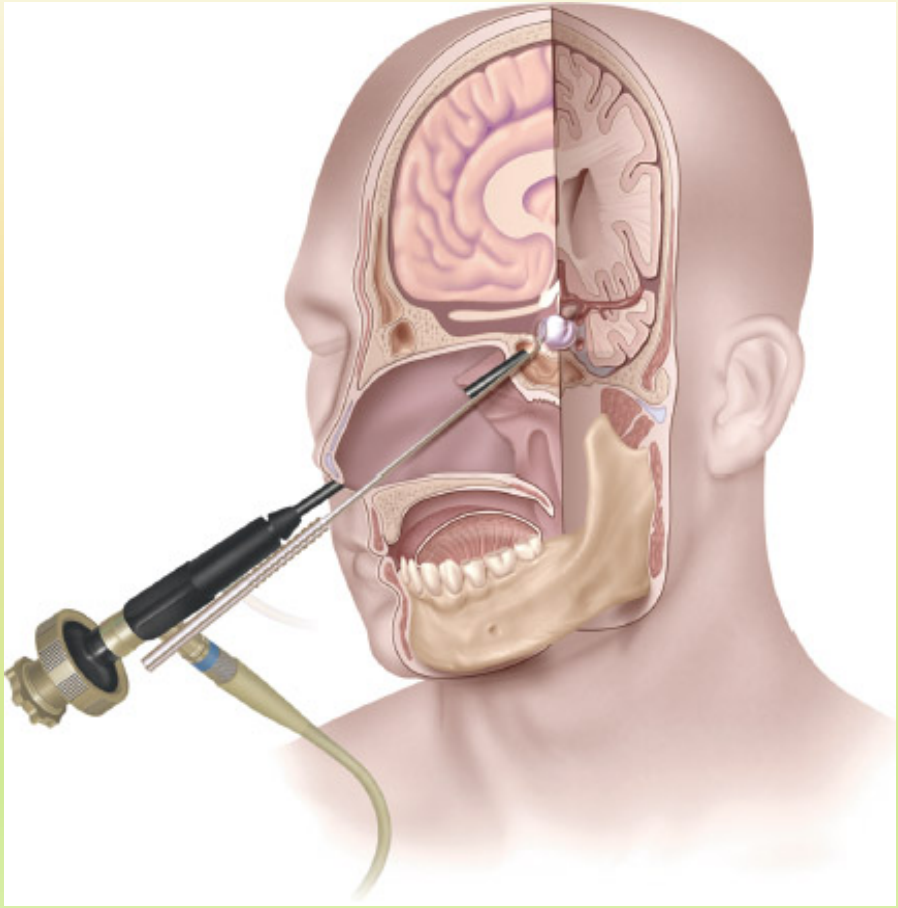
oncological treatment.

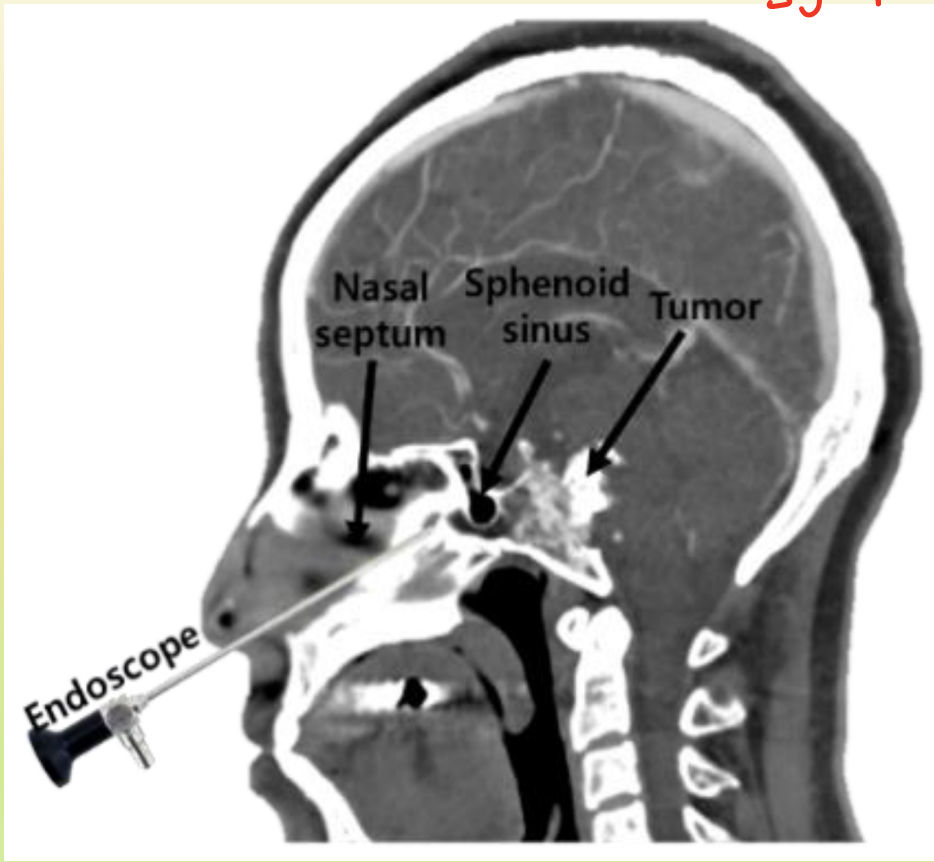
dopamine

selective non-selective

Transsphenoidal procedure

psychic symptom





All types of pituitary adenoma is treated surgically except prolactienoma, treated non-surgically (cabergoline or bromocriptine)
Note: cabergoline safest

- Macro pituitary adenoma emergent surgery (vision saving surgery if you didn't do it there is permanent visual damage
- Also growth hormone secreting pituitary adenoma (emergent surgery), they also should undergo colonoscopy ((screening)),why? High risk of colon cancer

مش مطلوب كفاصيل

- Choices of surgery : 1) coventional surgery (fronto -parito-temporal craniotomy) ,2)Endonasal trans-sphenoidal resection (best for tumours that are small in size , also confined to sella even if there is some suprasellar extension),BUT contraindicated in massive suprasellar extension .
- Internal carotid artery is adherent to sella turcica

pilocytic astrocytoma *يتشبه مثل

CT ، MRI في لا •

لكن هما نوعين مختلفين تمامًا ، في نفس المكان (Posterior) لكن هاي عند adult •

Hemangioblastoma

- Description: highly vascularized neoplasm
- Epidemiology :20–50 years
- Associated conditions: von Hippel-Lindau disease(AD , tumor suppressor gene mutation)

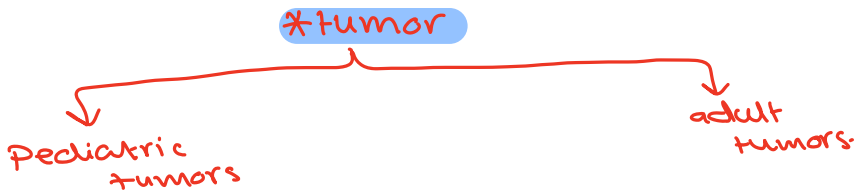
Clinical features:

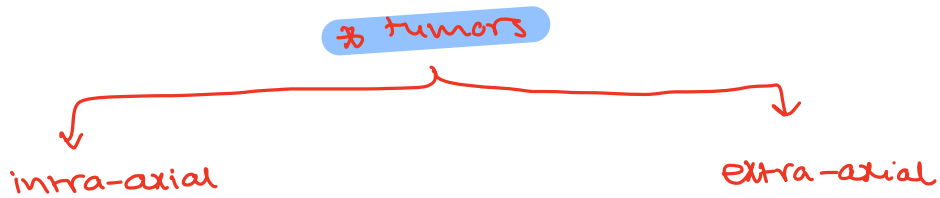
- cerebellum is the most common location → cerebellar defects(ataxia, imbalance, uncoordinated movements (dysmetria), dysarthria, and oculomotor disorders (e.g., nystagmus
- Erythropoietin production by tumor cells → secondary polycythemia

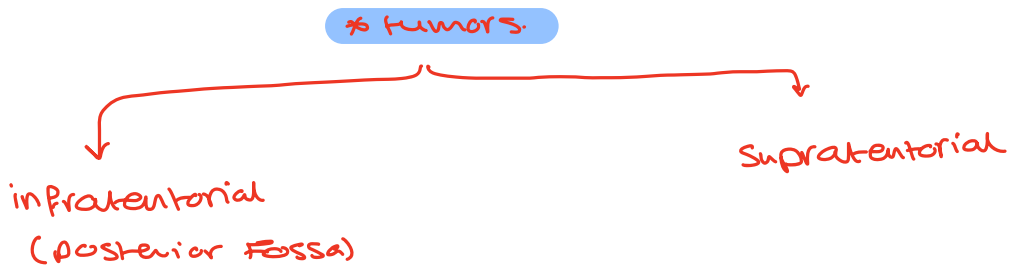
Diagnostics:

- MRI; cystic mass with a non-enhancing wall and an enhancing mural nodule
- Biopsy: thin-walled capillary vessels, densely packed together with scarce parenchyma

- Hemangioma is the most common posterior fossa tumor in adults , but this isn’t the only site of it , but it can also be found in spinal cord
- VHL any patient with hemangiomblastoma , look for VHL , because they are highly associated together (chromosome 3)
- Which tumour is associated with polycythemia ? (Hemangioblastoma)
- On MRI hemangioblastoma and pilocytic astrocytoma both look the same
- BUT hemangioblastoma appears as mural nodule that is toward a vascular structure , so you will find the hemangioblastoma attached to sinuses







* اول ما اشوف صورة بدّي احدد -

* هل هي MRI, CT ؟

1 * T_1 ، T_2 ؟

* with/without contrast

2 مكان : هل هو intra-axial او extra-axial .

3 anatomy : هل هو supra/infra tentorial او في sella turcica او pineal ؟

4 morphology : diffuse enhancement ، cystic ؟.

5 الـ history وشو العمر .

* دايمًا ركز على الـ most common .