glioblastoma

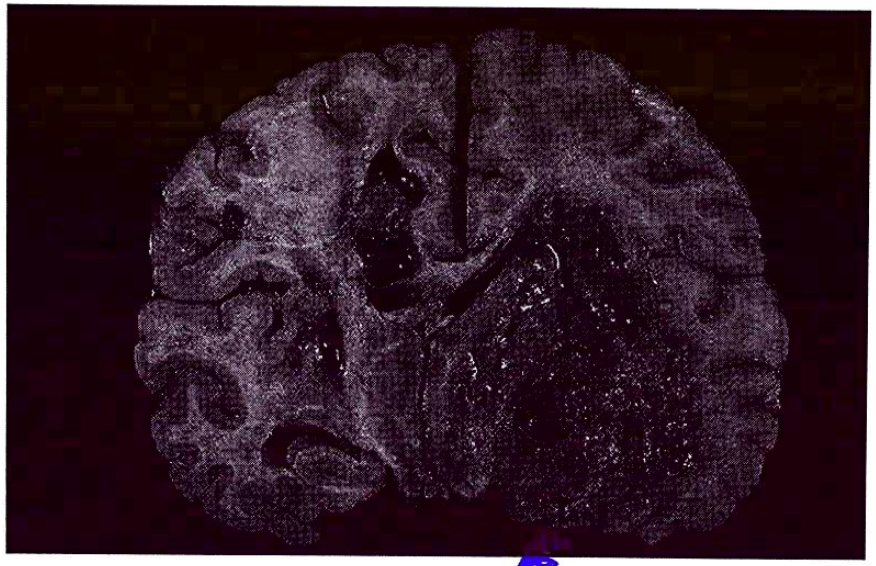
- primary → starts as glioblastoma from beginning
- secondary → progresses from a previous astrocytoma.

↳ very poor prognosis

=> It is called glioblastoma multiforme?

↳ Because histologically there is variation in tumor appearance.

- soft
- necrotic
- hemorrhagic



→ Genetics:

- IDH wild-type:
  - more common
  - frequently primary
  - patients over 55 years.
  - worse prognosis
- IDH mutant:
  - secondary glioblastomas.
  - preferentially arises in younger patients.
  - better prognosis
- NOS (not otherwise specified)
  - IDH evaluation can't be performed.

=> Note:

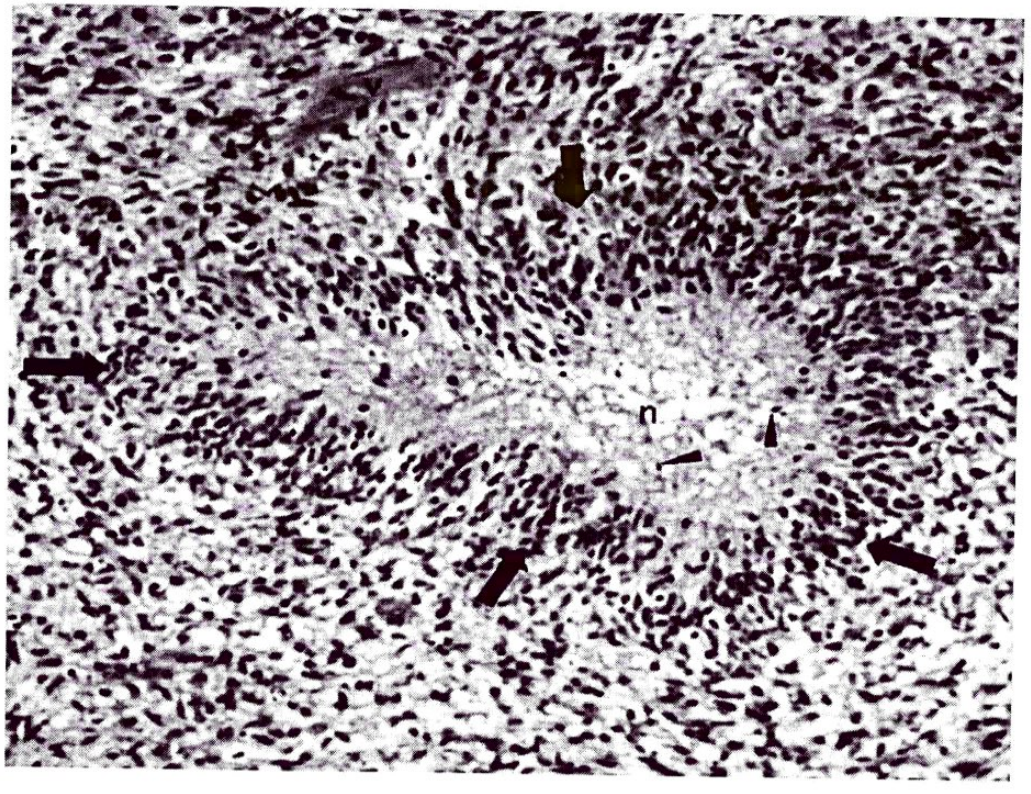
Those are all histologically similar

- anaplasitic
- Necrotic
- OR vascular proliferation

هي الدكتورة بتحبه

looks like a fence surrounding area of necrosis.

Glioblastoma/ palisaded nuclei around necrotic area

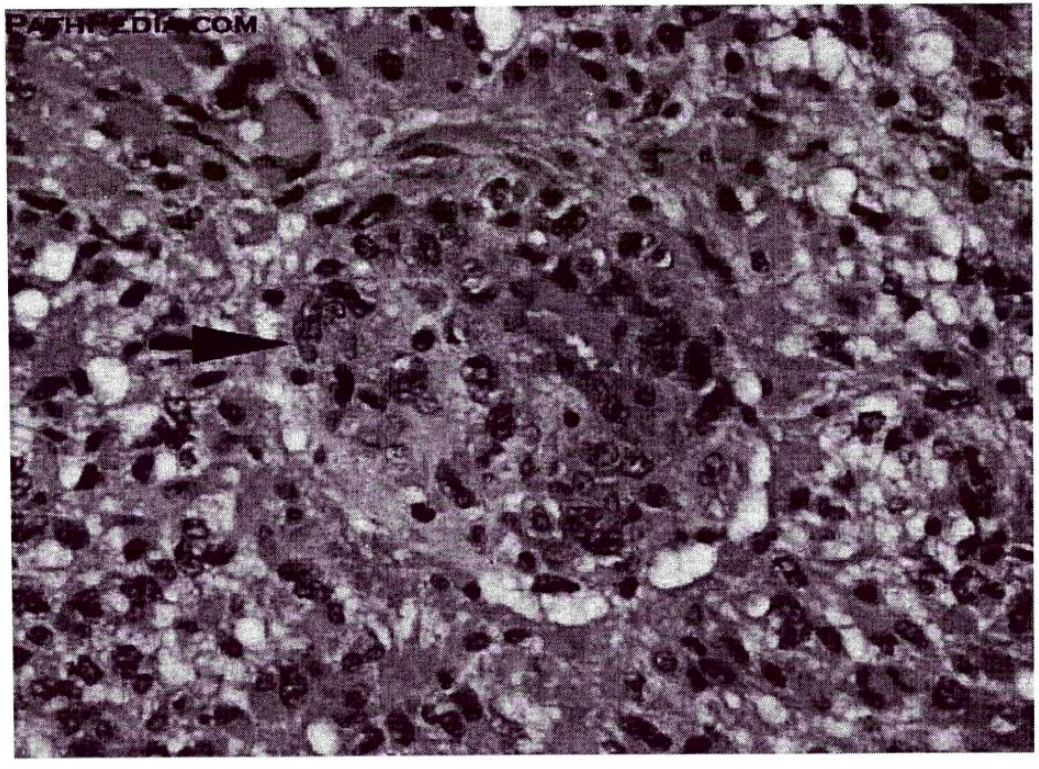


Indicates marked and severe vascular proliferation

Glomeruloid body/ vascular proliferation in glioblastoma

→ proliferative cells bulge into the lumen.

→ if minimal vascular Proliferation
→ Presence of double endothelial layer around blood vessels.



→ Note:
→ Due to the presence of abnormal leaky vessels this allows for contrast enhancement on MRI.

← قبل الصورة بيوطلوا المريض الـ contrast بالدم، و عشان الـ BBB خربان بيوصل الصبغة للمكان الخربان فيه وبتدخل على الدماغ وبتلون.

- slowing growing
- treated by resection

Pilocytic astro: this example is mainly cystic but has also a solid component

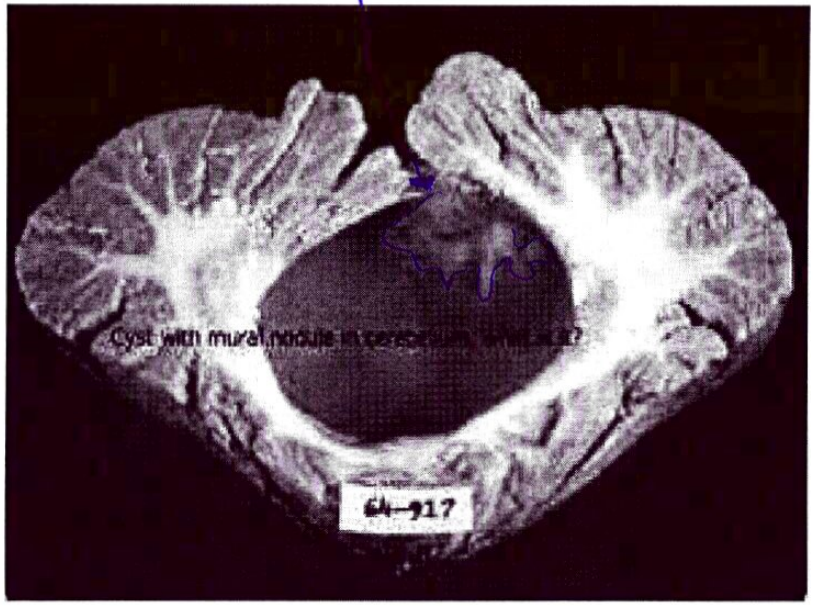
- Are grade 1 astrocytomas
- children and young adults

ما تنعمر بالكبار

- Mostly in cerebellum

But can also invade.

- 3rd ventricle
- Optic pathway
- Spinal cord.

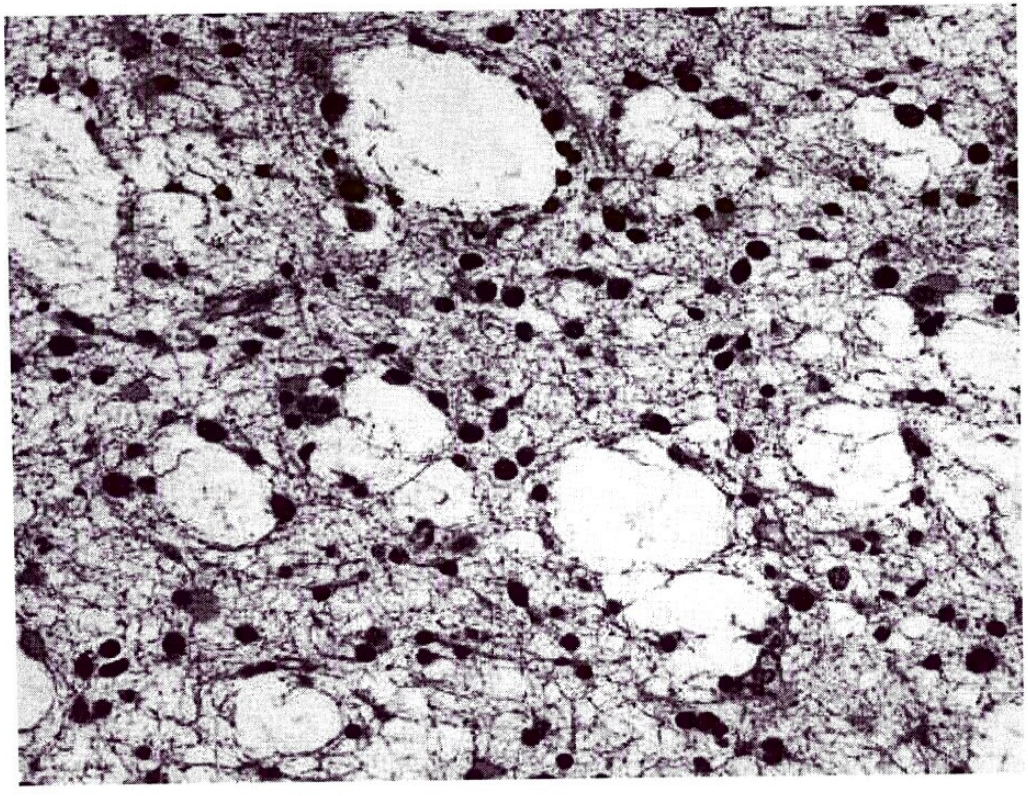


- Mass has both
  - Solid ⇒ well-defined
  - and cystic components
- Microscopically
  - GFAP stain positive
  - Rosenthal fibers : eosinophilic protein aggregates
  - microcysts
- ⇒ Mitosis and necrosis are rare.

remember it ↵ is a grade 1 tumor.

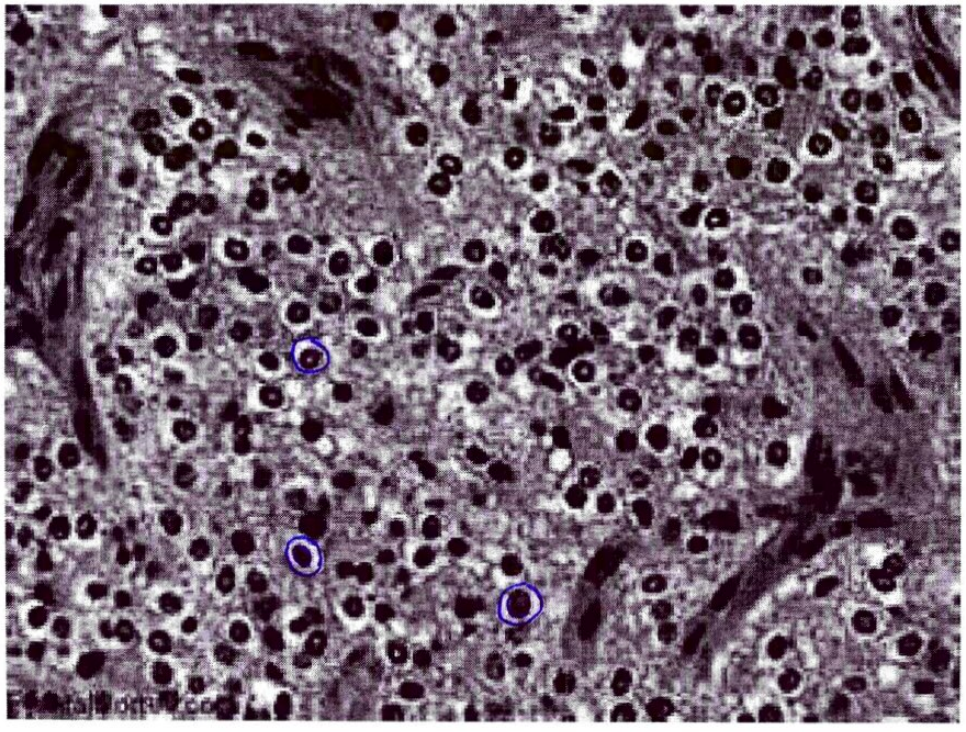
(Note :)
⇒ Those "rosenthal fibers" can also be seen in chronic gliosis.

Pilocytic/ microcysts

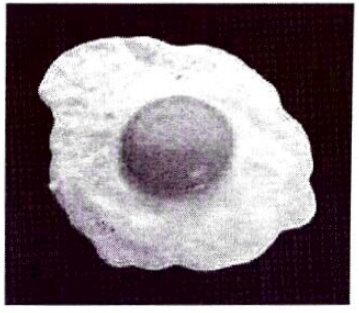


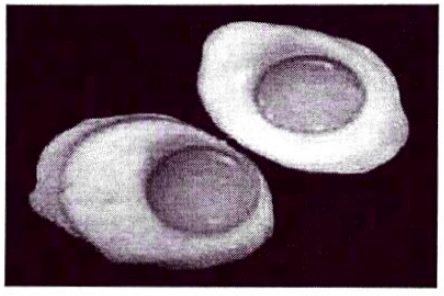
- Cerebral hemispheres → mainly white matter → arise at 40-50 years of age
- better prognosis than astrocyte of same grade
- No grade 1 oligodendrogliomas
- → oligo can progress to glioblastoma.

oligodendroglioma;/ note the white halo around the nuclei giving the fried egg appearance



- Gross feature:
  - infiltrative, gelatin
- Genetics: ← imp
  - IDH mutation and co-deletion of 1p, 19q.
  - ↓
  - good prognosis

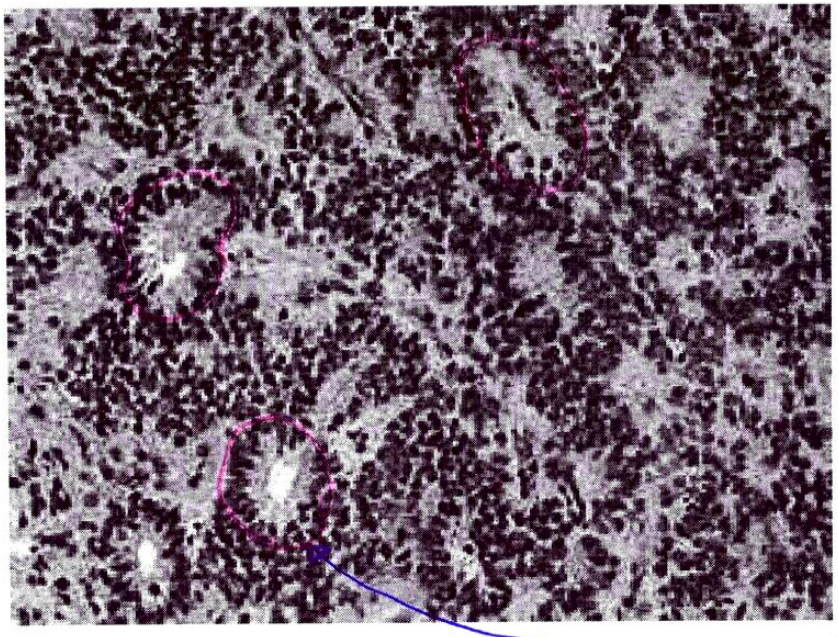




- notice cells are regular and their nuclei are spherical.
- cytoplasm is clear.

Ependymoma/ rosettes
note: true rosettes arise around canals

↳ And pseudo rosettes around blood vessels.



- Ependymomas are glial neoplasms.
  - ependymal cells and so:
    - arise next to ventricles
      - central canal of spinal cord
  - if patient is in first two decades of life → tumor found around 4th ventricle.
  - Spinal cord tumors are common in adults.
  - resectable tumors have good prognosis.

- Tumors related to ependymomas:
  - choroid plexus papilloma
  - Benign and rare: subependymoma, colloid cysts.

But → result in hydrocephalus.

- if it is anaplastic (not shown):
  - high cellularity
  - mitosis
  - necrosis

- true rosettes
  - fibrillary background
    - GFAP stain positive
  - Regular round nuclei
    - and chromatin is granular

- Gross fiture of ependymomas:
  - Solid OR papillary masses

medulloblastoma

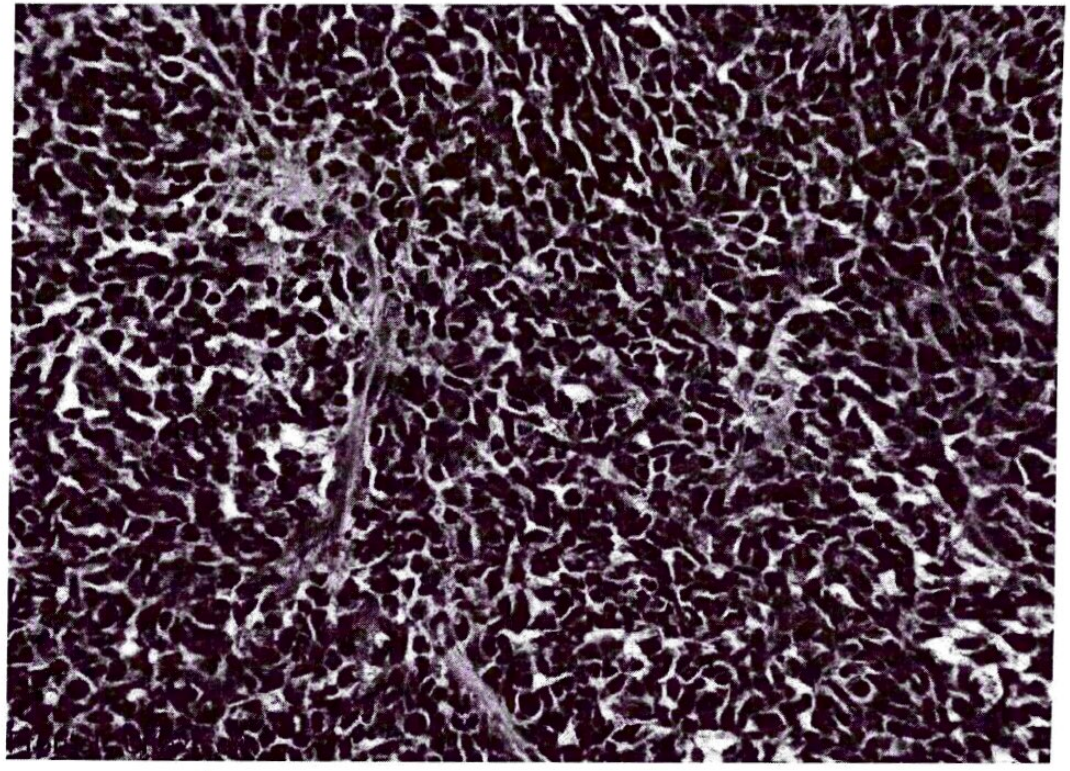
→ Grade 4 tumor
→ Highly malignant if untreated
  ↳ it is radiosensitive.
  → 5 year survival = 75%
    ↳ high survival rate if treated.

⇒ occurs in children.
⇒ only in cerebellum.

→ Genetics:
  ↳ MYC Poor prognosis
  ⇒ WNT signaling better prognosis
    → Beta catenin stain
      ⇒ if (+)
        → WNT medulloblastoma
          → better prognosis
            ↳ survival 90%

→ 10% of medulloblastomas have activating mutations in β-catenin (ie. WNT)

→ Nuclear-β catenin
  ⇒ 100% specific and sensitive for mutation.

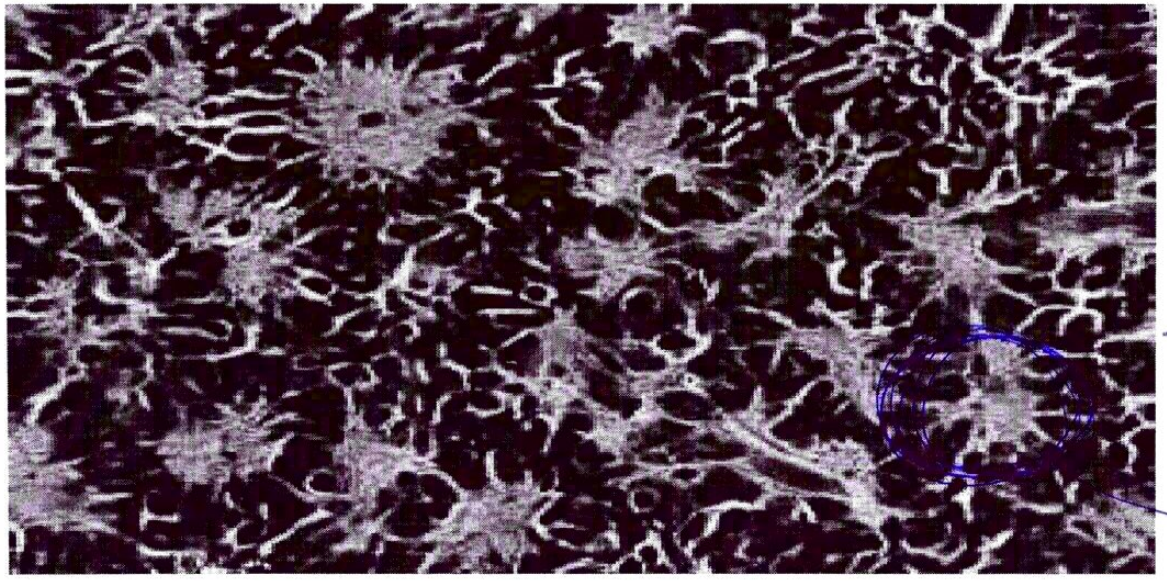


↳ Highly cellular
→ The section in grey scale appears highly darkened because the cells are hyperchromatic (nucle
→ many mitoses ⇒ "not seen here" with little cytoplasm

⇒ in a colored section → cells appear as sheets of small blue cells.

Homer Wright Rosettes

- Medulloblastoma
- Children
- Cerebellum
- WNT mutation → better prognosis than MYC
- Radio sensitive



- primitive tumor cells surrounding central neurophil
  - pink material formed by neuronal processes.

→ Meningioma mass in this section has the following characteristics:

⇒ Origin → arachnoid meningiothelial cells

⇒ arise in adults ⇒ benign tumors.

⇒ attached to dura and can be seen at external surfaces of → brain (as in the section) / → or within the ventricular system.
→ remember it has an arachnoidal origin.

⇒ can be easily separated from brain.
→ But sometimes it is infiltrative.

→ Has 3 histologic grades: (differs from the glioma classification)

I: well differentiated.

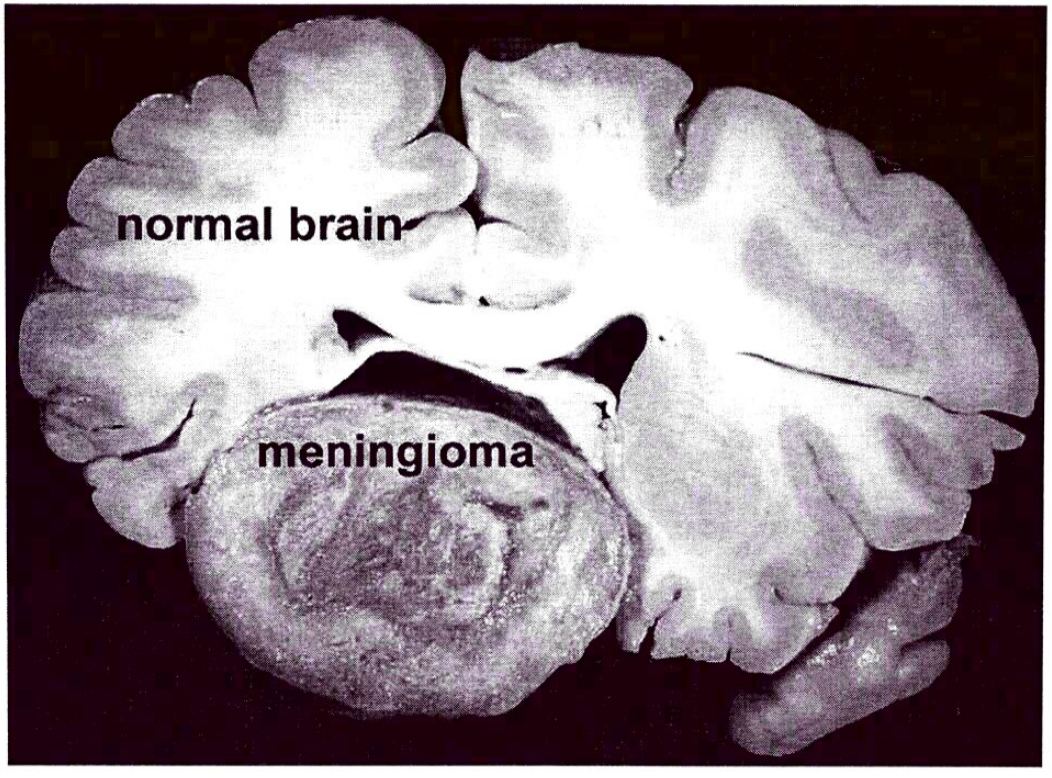
II: atypical

III: anaplastic

→ Grade 1 meningiomas:

may extend to overlying bone ① but do not invade the brain ② ⇒ well defined, dura based.

↓ could potentially compress the brain ⇒ symptoms arise.



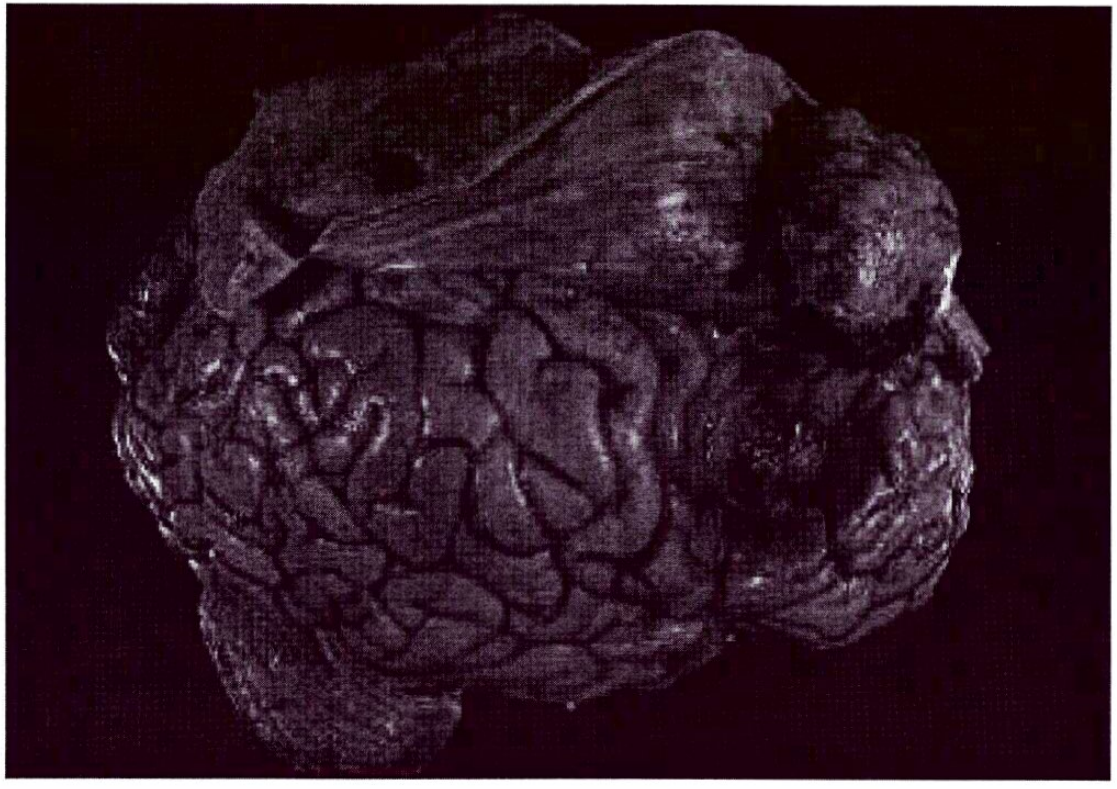
⇒ Grade 1 is subdivided to several histologic types
→ next slides.

1 → Syncytial ⇒ [illegible]
2 → fibroblastic ⇒ [illegible]
→ transitional ⇒ [illegible] 2 و 1
→ Psammomatous.

Psamma bodies [illegible]

Meningioma.. Note that the mass is related to the dura, not the brain parenchyma

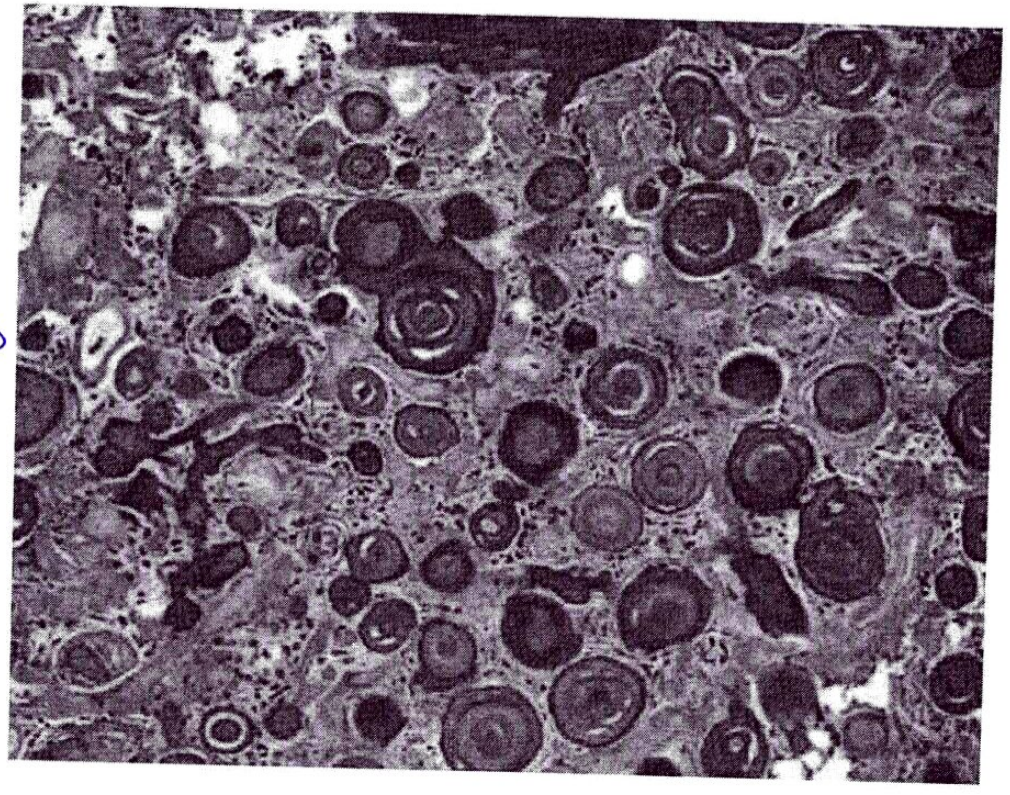
↳ Dura based and arises from arachnoid.



pasammomatous

- Benign
- Grade 1
- common in adults
- related to dura and arises from arachnoid

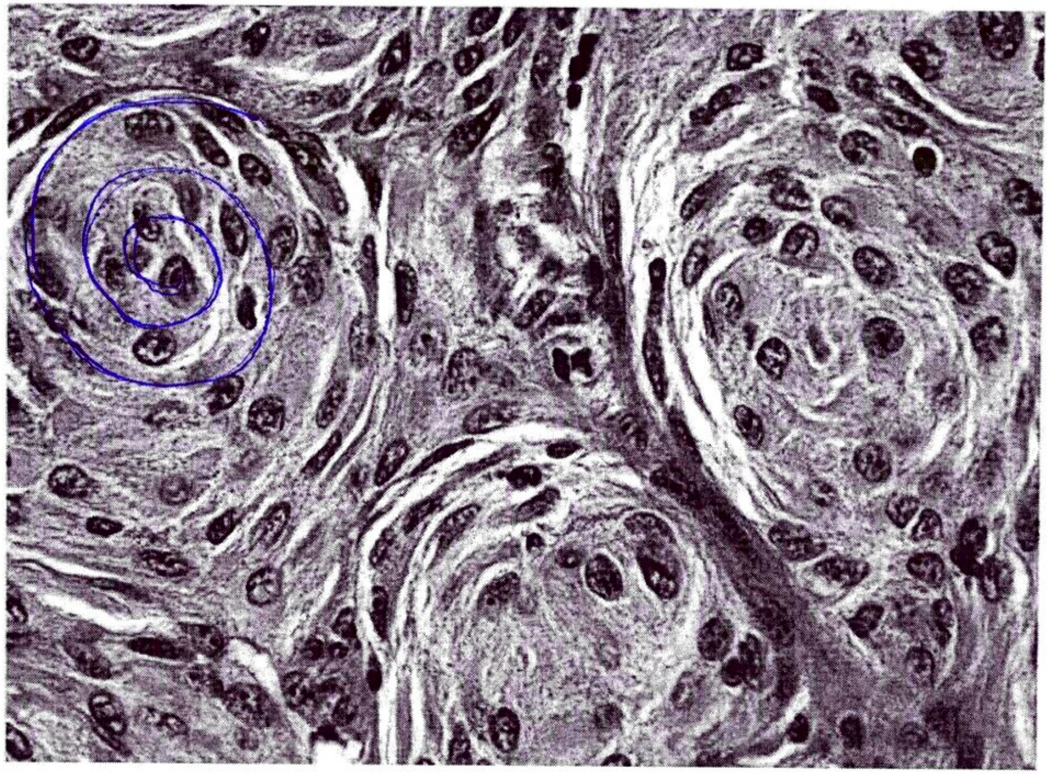
Psammoma bodies → ملتين



syncitial

- → benign
- → Grade 1 meningioma
- → common in adults
- → related to dura and arises from arachnoid.

no visible membrane between cells →



⇐ اكلايا لـرفين لف على بعض ◎

lymphoma

→ CNS lymphoma → if primary:

⇒ most common CNS neoplasm in immunocompromised

⇒ almost always positive for EBV.

⇒ Mostly: diffuse large B cell lymphoma

important ⇒ 1% of all intracranial neoplasms.

→ CNS* lymphomas in general have a poor response to chemotherapy as compared to peripheral lymphomas.

*: aggressive with poor prognosis.

⇒ In the section on the right ⇒

⇒ Notice multiple nodules within brain parenchyma (1,2,3,4) ⇐ grey matter, white matter, cortex

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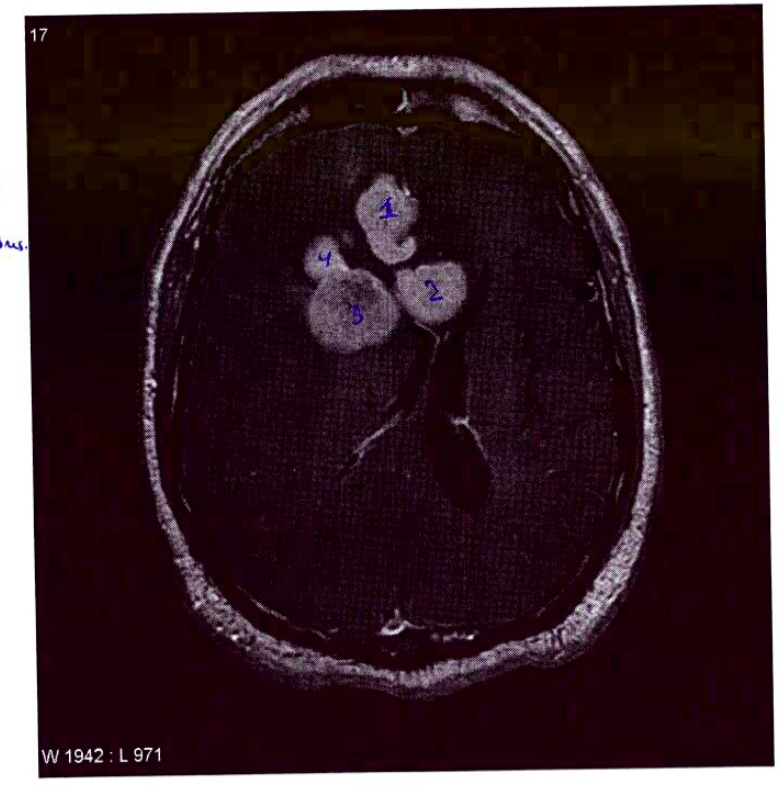

important

→ General notes:

⇒ lymphoma nodules are:
- more defined than gliomas
- less defined than metastases.

⇒ if tumor is EBV positive → has extensive areas of necrosis.

⇒ spreading of CNS lymphoma outside to periphery happens rarely and at late stages

⇒ peripheral lymphoma rarely spreads to the brain.

important: So if a patient represents to you with multiple nodules in brain, and has a neoplastic mass somewhere else in his body ⇒ his CNS tumor is probably a metastasis.

↳ constitutes 1/4 to 1/2 of intracranial tumors.