Tumors

Cont.

ENAS ABU EWAIDA

Oligodendroglioma

- Best prognosis of glial tumors.
- 5-15% of gliomas.
- 4-5 decade.
- White matter of cerebral hemispheres.

Pathogenesis

- IDH mutation and whole arm chromosomal codeletion 1p and 19q.
- With progression to anaplastic form loss of CDKN2A.
- No EGFR amplification (in contrast to high grade astrocytoma).
- TERT promoter mutation (as in glioblastoma).

Morphology

- Often with cyst, micro (sand-like) calcification.
- Microscopy: rounded, regular nuclei, relatively evenly-distributed chromatin (in contrast to astrocytoma), white clear spaces around the nucleus (clear halo), very thin-walled blood vessels (chicken-wire pattern).
- IHC: IDH mutation might be detected.

Anaplastic oligodendroglioma: more severe, has more mutations meaning it is more resistance to therapy and has a lower survival rate.

Pilocytic astrocytoma

- Grade 1. Benigin , well demarkated.. there is clefting between the normal and tumor cells.
- More discrete borders.
- Relatively benign behavior.
- Children and young adults. [rare in elderly]
- Cerebellum and around III ventricle.
- KIAA1549-BRAF gene fusion/duplication.

Morphology

solid area

- Well-demarcated and cystic with mural nodule.
- Limited brain invasion. there is space
- Loose microcystic and dense fibrillar areas.

morphology

فتى ال nodules
فيها micro cystic
يتجمع فيه السائل

- Microscopy: cells are elongated and has multiple thin processes (like hair).
- Rosenthal pattern, which is an elongated eosinophilic structure (characteristic in slowly growing tumors).

in the low grade Benigin tumor

Ependymoma

- Close to ependymal cells lined spaces (ventricles and central canal).
  ↳ make collection of BS in specific site. in the ventricles and called choriod plexus..
- 1-2 decades:

Near the IV ventricle. in children.

5-10% in the primary brain tumors in this group.

- In adults:

in adult

The spinal cord is the most common location.

Frequently in the setting of NF2.

NF: neurofibromatosis. 2 subtype → NF1, NF2 ⇒ most frequent in adult..
↳ in the adult.

Pathogenesis

NF2 gene mutated in spinal cord tumors (adults).

Distinct sets of driver mutations not shared with those of astrocytoma.

Morphology

- Solid non-infiltrative.
- Cerebrum, cerebellum and spinal.
- Microscopy: oval cells, rosette formation (both types), there is a space between the cells and the blood vessels in which the processes of these cells extend.

True rosette formation: cells are arranged around a lumen.

Pseudo rosette formation: cells are arranged around blood vessels.

2 variants:

- Myxopapillary ependymoma: usually in filum terminale.
- Subependymoma.

Filum terminale: an extension of the pia mater that extends from the terminal end of the spinal cord to the tailbone.

Choroid plexus tumors

- Rare.
- Benign or malignant.
- Choroid plexus papilloma:

Most common in children; lateral ventricles.

In adults IV ventricle.

Hydrocephalus.

CSF is increased in:

- Overproduction caused by a tumor in choroid plexus especially benign.
- Obstruction.
- Reduced absorption like in some types of arachnoidal inflammation leading to fibrosis of the granularity responsible for absorption.

Neuronal and glioneuronal tumors

- Gangliogliomas.
- Dysembryoplastic neuroepithelial tumor.

Medulloblastoma

- Embryonal primitive neoplasm.
- 20% of pediatric brain tumors.
- Exclusively in the cerebellum.
- Predominantly in children (less than 10 yo).

Embryonal primitive cells have:

- Large nucleus, evenly dispersed chromatin.
- Scarced cytoplasm, high nuclear/cytoplasmic ratio.
- High mitotic activity.
- Cells are similar to the origin.

Pathogenesis

SHH (sonic hedgehog) pathway: The vermis or lateral cerebellum.

WNT pathway:

- Around the anterior IV ventricle.
- Or middle cerebellar peduncle.

Morphology

- Often well circumscribed.
- May involve the leptomeninges (the arachnoid and the pia mater) which may lead to CSF dissemination.
- Microscopy: monotonous cells, even chromatin.
- Mitosis is very high.
- Homer Wright rosettes.
- Desmoplastic nodular variant: Almost always SHH activated.
- Large cell anaplastic variant.
- Subarachnoid/SF dissemination.

Karyorrhexis: A stage of cellular necrosis in which the nucleus fragments and its chromatin is distributed irregularly throughout the cytoplasm.

Meningiomas

- Tumors of adults, grade 1.
- Arise from the arachnoid (not a CNS tumor).
- Usually attached to the dura.
- Along any point of the external surface.
- Or within the ventricular system (from the choroid plexus).
- Previous radiotherapy is a risk factor.

Pathogenesis

- Common lesion in NF2.
- 50-60% of sporadic cases show mutant NF2 gene.

Morphology

- Gross:

En plaque growth: instead of forming a mass, we see thickening of the dura.

Firm to gritty (psammoma), like the calcification in oligodendroglioma but in a concentric pettern.

- Microscopy:

3 types:

- Meningothelial.
- Fibroblastic.
- Transitional.
- They are similar to each other so it doesn't matter.

Concentric wrapping (whorls).

Psammomatous:

*traditional meningioma → grade I [Benign] need surgical removal.

Atypical meningioma

- Grade 2.
- One fourth of the cases.
- Higher recurrence rate.
- RT in addition to surgery.
- Aggressive features.
- Clear cell and choroid patterns are grade II by definition.

Anaplastic meningioma

- Grade 3.
- 1-3%. [more aggressive]
- Carcinomatous/sarcomatous features instead of the typical features of meningiomas.
- Papillary and rhabdoid variants.