HISTOPATHOLOGY OF CNS TUMOURS

DR AYE AYE WYNN

DEPARTMENT OF PATHOBIOLOGY & MEDICAL DIAGNOSTICS
ASTROCYTOMAS

- **Site:** cerebral hemisphere, cerebellum, brain stem, spinal cord
- **Age:** usually affect *adults*, pilocytic astrocytoma is common in children and young adults

### WHO histologic grading of astrocytic tumours

<table>
<thead>
<tr>
<th>WHO classification</th>
<th>WHO grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilocytic astrocytoma</td>
<td>Grade I</td>
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<tr>
<td>Astrocytoma</td>
<td>Grade II</td>
</tr>
<tr>
<td>Anaplastic astrocytoma</td>
<td>Grade III</td>
</tr>
<tr>
<td>Glioblastoma (multiforme) (GBMF)</td>
<td>Grade IV</td>
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</tbody>
</table>
Histology

- **Low grade astrocytomas**: mild to moderate increase in glial cell nuclei, nuclear pleomorphism, GFAP +ve

- **Anaplastic astrocytoma**: more cellular, more pleomorphic

- **GBMF**: all features of *anaplastic* features & increased Mitoses. *vascular and endothelial proliferation* (forming glomeruloid body). Serpentine necrotic areas surrounded by highly malignant astrocytic cells (*Pseudopalisaded necrosis*)
GBMF showing cellular tumour with atypical features
ENDOTHELIAL PROLIFERATION
GLOMERULOID BODIES
Necrosis (red arrow) seen as Amorphous Eosinophlic material & Palisading viable tumour cells (blue arrow)
Pseudopalisaded necrosis
MENINGIOMA
Meningioma

- Common in Females
- Etiology: association with progesterone receptors
Sites of Meningioma

- Falx & parasagittal 25%
- Convexity 20%
- Sphenoid ridge 20%
- Posterior fossa
- Olfactory groove
- Suprasellar
- Intraventricular
- Spinal
Histology

- Usually WHO-Grade I/IV
- **Histological types**: no prognostic significance
  - Meningothelial or syncytial type: whorled clusters of cells with indistinct cell membranes
  - Fibroblastic type: elongated cells with abundant collagen deposition
  - Transitional: with features of both types
  - Psammomatous: with numerous calcified spherules (psammoma bodies)
**IHC:** Progesterone receptor

Epithelial membrane antigen (EMA) positivity, CEA

Positivity in secretory type

**Aggressive histology types/bad prognosis**

- **Atypical meningioma** (WHO II/IV): Atypical histological features, 4- more mitoses/10 HPF
- **Anaplastic (malignant) meningioma** (WHO III/IV): Mitoses >20/10 HPF
- **Papillary meningiomas:** WHO grade III/IV
- **Brain invasion**
Whorls of meningothelial ells and calcification
Calcification
Meningioma (yellow arrow) (Meningothelial type) with brain invasion (Blue arrow)

https://commons.wikimedia.org/wiki/File:Meningioma_-_brain_invasion_-_very_high_mag.jpg
PERIPHERAL NERVE SHEATH TUMOURS
SCHWANNOMA

- **Origin**: neural crest-derived Schwann cells
- **Common Site**: cerebello-pontine angle (CP) angle

**Symptoms**

- Acoustic neuroma: Hearing loss, vertigo, sensory symptoms on face, distortion of fourth ventricles → hydrocephalus
- Sporadic form - association with NF2 gene mutation on chr 22

**Gross**: well circumscribed, firm gray masses, cystic, encapsulated, attached to the nerve and can be separated from it
Histology

- **Antoni A pattern**: elongated cells with cytoplasmic processes, *densely arranged* in fascicles, nuclear free zones that lie between the regions of *nuclear palisading* (*verocay bodies*)

- **Antoni B pattern**: less cellular with loose meshwork of cells, microcysts and *myxoid* changes

- Malignant change: rare

- **Immunohistochemistry**: S 100 +ve
Schwannoma
Antoni (A) areas (green arrow) and Antoni B areas (yellow arrow)

Antoni A: Fascicles of densely arranged spindle cells
Antoni B: Loose area with microcysts and myxoid changes
Thank you