Third ventricular tumours:

- **Anatomy:**
- **Third ventricular anatomy:**

-anterior wall-column of the fornix with anterior commissure in front, lamina terminalis and optic chiasm

-Inferior wall: optic chiasm, infundibulum, tuber cinereum mamillary bodies, posterior perforated substance and superior tegmentum of midbrain. It contains **optic and infundibular** recesses.

-**Lateral wall**: thalamus superioposteriorly and hypothalamus anterioinferiorly with hypothalamic sulcus in between (running from foramen of Munro to aqueduct). Thalamic adhesion or Massa intermedia exists in 60% of people. Numerous limbic projections course through this wall (**stria medullaris**, **thalamomammillary tract**, median forebrain bundle and fasciculus retroflexus), hence the deficit in short term memory with periventricular lesions.

-**Superior wall (roof)**: Tela choroida (double fold of pia, the upper layer is on the under surface of the fornix and the lower layer on the upper surface of the thalamus. This is the true roof of the third ventricle with **vellum interpositum** cistern in between these two layers and contains the **internal cerebral veins** and the **medial posterior choroidal arteries. The choroid plexus of the 3-d ventricle (double)** projects from the midline of tela choroida. Laterally tela choroida projects into the choroidal fissure between the thalamus and fornix. The choroid plexus of the lateral ventricle projects its fringed edge. Above the tela choroida are the body of the fornices anteriorly and the crura with hippocampal commissure posteriorly..

-Posteriorly: **the habenular commissure** formed by junction of the stria medullaris (sheath of white matter running on the upper surface of the thalamus). The **posterior commissure** connecting both superior colliculi. Between them is the pineal recess containing the pineal gland? Above the habenular commissure is the suprapineal recess. Below the posterior commissure is the aqueduct. . **Hippocampal commissure** connects the crura of the fornices

-Foramen of Munro: bound anteriorly and superiorly by the fornix and posteriorly by the anterior pole of the thalamus. It transmits the choroidal plexus and the internal cerebral vein formed by the confluence of the thalamostriate vein, septal vein and choroidal veins and posterior medial choroidal arteries.

A. Anterior third ventricle

I. Neuroepithelial tumours:

1. Juvenile Pilocytic astrocytoma arising from the hypothalamus or optic pathways.

2. Fibrillary astrocytoma, AA, GBM: from the thalamus with secondary extension into the third ventricle

3. Ependymoma: rarely arises in the third ventricle

4. SEGCA: pathognomonic for tubular sclerosis more common in the lateral ventricle

5. Neurocytoma

6. Choroid papilloma and carcinoma

II. Metastatic tumours

III. **Suprasellar tumours** with secondary extension into the third ventricle

1. Craniopharyngioma: 2 peaks childhood and middle age (decrease in visual acuity and visual field defects, hypopituitarism including DI and hydrocephalus). Partially solid and partially cystic with calcification

2. Germinomas: Similar presentations, solid tumours (always check tumour markers (AFP, B-HCG and placental ALP)

3. Pituitary tumours with suprasellar extension: always there is sellar component.

IV. **Cystic lesions**

1. Colloid cysts: benign congenital cyst occurring in the anterior third ventricle behind foramen of Munro and usually attached to the roof of the third ventricle through a pedicle or wide sessile attachment. Account for 0.2-2% of brain tumours. **The most common third ventricular tumour**

- Presentations:

- The classical paroxysmal headaches related to posture are rare .more commonly the headaches are progressive
- Drop attacks are rare (sudden weakness in both legs leading to fall and thought due to stretching of the medial fibres of corona radiata "leg fibres")

- Asymptomatic
- Sudden death: **52 reported cases** due either to hydrocephalus or to venous obstruction of thalamostriate veins and cardiorespiratory reflexes from hypothalamic venous insufficiency (theory)

• Diagnosis: CT scan- **hyperdense lesion** (protein and calcium) but can be iso or hypodense, MRI-oval or round lesion in the region of foramen Munro with or without hydrocephalus (variable intensity usually high on T2)

• Histology: outer fibrous layer and inner **layer pseudo stratified columnar or cuboid epithelium** with mucin producing cells. The cyst content is gelatinous .size from few mm to 9 cm

• **Theories of origin**:

1. Paraphysis: columnar structure in the roof of the 3d ventricle that exists transiently between 7-14 weeks of embryonic life.

2. Ependymal recess trapped in the roof of diencephalon

3. From neuroenteric epithelium similar to Rathke's pouch cysts

4. From primitive neuroectoderm (Kaye page 989)

• Management: 1. If the patient presents with acute hydrocephalus unconscious bilateral ventricular drain followed later by a definitive procedure
2. Asymptomatic:

A. In young healthy individual -surgery (small but definite risk of sudden neurological deterioration or death

B. In elderly with medical problems follow up is an option, particularly if the lesion is small.

3. Surgery:

A. Excision through transcortical approach (5% epilepsy, difficult if the ventricles are small, small risk of hemiplegia "retraction on the genu of internal capsule in the subependymal layer in the groove between the head of caudate and thalamus. Always fenestrate the septum pellucidum

B. Transcallosal approach: risk of venous injury, leg paresis and injury to pericallosal arteries "rare". Less epilepsy and easier in the absence of hydrocephalus

C. Endoscopic aspiration/excision (rarely achieves total removal of the wall, hence higher risk of recurrence). The contents of the cyst are viscous and may be hard to aspirate

D. Stereotactic Aspiration: out of favour, thick content that is difficult to aspirate, leaves the wall of the cyst (recurrence), risk of haemorrhage (multiple venous structures in the area).

2. Epidermoid and dermoid cysts: rarely occur in the third ventricle

3. Neurocystocircosis: endemic in Mexico, Asia and Eastern Europe. The lesions are multiple in the subarachnoid space and brain parenchyma and intraventricular.

V. **Inflammatory lesions**:

1. Pyogenic abscess: rare

2. Tuberculosis, fungal infection: rare

3. Sarcoidosis: the CNS is involved in 5%. It can affect the floor of the third ventricle

4. Langerhans cell histiocytosis should be considered in the differential diagnosis of peri-third ventricular lesions. In the case of isolated pituitary stalk thickening consider germinoma and histiocytosis in the differential diagnosis.

B. Posterior third ventricle: extension of pineal tumours.

1. Thalamic astrocytomas(AA, GBM)
2. Germ cell tumours (germinoma, ECC 9embyonal cell carcinoma), EST 9endodermal sinus tumour), choriocarcinoma and teratoma and mixed tumours)
3. Pineal parenchymal tumours (pineocytoma, pineoblastoma and mixed tumours)
4. Metastasis