Intracranial Mass lesions & Raised Intracranial pressure.

① Raised Intracranial Pressure

Causes

① Mass lesion

a) Intracranial hemorrhage
- Extradural hematoma
- Subdural hematoma
- Intracerebral hemorrhage

b) Cerebral tumours
↓
Particularly in the Posterior fossa or Cerebellum.

c) Infective:
- Cerebral abscess
- Tuberculoma
- Cysticercosis
- Hydatid cyst.

② Disturbance of CSF

a) Obstructive (obstruction within)

b) Communicating (obstruction from outside)

③ Obstruction to Venous Sinuses
- Cerebral venous thrombosis.
- Trauma (Depressed fracture overlying sinuses).

④ Diffuse Brain edema or Swelling
→ Meningoencephalitis
→ Trauma (Diffuse head injury)
→ Subarachnoid hemorrhage.
→ Metabolic
→ Idiopathic intracranial hypertension.

In adult. intracranial pressure is less than 10-15 mm Hg.

C/F of Intracranial mass lesion

(1) Seizures → Focal onset ± generalized Spread

(2) Focal Symptom → Progressive loss of function, Weakness, numbness, Dysphasia, Cranial neuropathy.

(3) Focal localizing signs → Unilateral / Bilateral 6th nerve palsy - Contralateral 3rd nerve (usually pupil first)

(4) Raised intracranial Pressure → Headache worse lying / shaking
- Vomiting, Diplopia (6th nerve)
- Papilloedema
- Bradycardia. Raised Blood pressure.

(5) Stroke / TIA. → Acute Hemorrhage.

(6) Cognitive / Behaviour → Usually frontal mass deficits.

(7) Endocrine abnormality → Pituitary tumours.

(8) Incidental Finding → Asymptomatic but identified on imaging (Meningioma)

Complication

Downward displacement of medial temporal lobe causes temporal Coning

Downward displacement of Cerebellar tonsil causes Tonsillar Coning

↓

Hemorrhage or Hydrocephalus.

Brain Tumours

→ Masses of abnormal cells ; due to uncontr. cell growth.

Cells within Brain

① Neurons →
② Neuroglial cells → Astrocyte (BBB) oligodendro (Myelin)
③ Hormone secreting cells →
- Supratentorial Pineal gland
- Infratentorial Pituitary gland.

* Primary Brain Tumour

→ Usually 1° malignant, and they usually don't metastize due to absence of lymph.

→ Classification is not By TNM it is by WHO classification from 1 to 4 (Grade) .

I - Benign, IV → Malignant.

Classification

Malignant	Benign
① Glioma (Astrocytoma) → (Common)	① Meningioma (Incidental finding)
② oligodendroglioma.	② Neurofibroma
③ Medulloblastoma	③ Craniopharyng.
④ Ependymoma	④ Pituitary adenoma
⑤ Cerebral lymphoma.	⑤ Pineal tumor
	⑥ Colloid cysts.

Pathology

↑ Protooncogene & ↓ Tumor suppressor gene

Abnormal proliferation → Tumor

Secondary Brain Tumor → From Metastasis of Lung, Breast, GIT.

Risk Factors

① Ionizing radiation

② Immunocompromised ③ Genetic

Secondary to Genetic disorders

① Neurofibromatosis

↓ Nerves ↓ Fibrous ↘ & Tumor.

- Fibrous tumour originating from the nervous system.

→ Each nerve is surrounded by nerve sheath which is produced by fibroblasts inside which myelin and axons present.

→ Autosomal Dominant inherited disorder.

and Benign in growth.

Two Type → NF 1 NF 2

↓ ↓

Mutation in 17 chromosome chromosome 22

↓ Tumor suppressor gene

Neurofibromatosis Type 1 (Von Recklinghausen's Syndrome).

→ Affects nerves in extremities and skin:

Causing neurofibromas (containing Schwann cells, fibroblast, immune cells).

→ Just beneath skin and peripheral nerve along

→ Painless, mobile, lumps under skin.

→ Cafe-au-lait spots → Back, Buttocks, thighs

increase in numbers.

→ Lisch nodules in eyes, appear by age 6.

but no difficulty in vision.

→ Risk → large neurofibroma press on organs, Kidney, Brain, etc.

Neurofibromatosis Type II

→ Affects Brain, Spinal cord, Cranial nerves.
→ Skin neurofibroma & Cafe au lait spots are less common.
→ Schwannoma is present.
↳ Commonly along the 8th cranial nerve causing acoustic neuroma; at the nerve entry point into medulla on the internal auditory meatus; on the vestibular division
→ It can also occur without NF but in NF occurs Bilaterally.
→ Tinnitus & Gradual loss of Hearing.
→ Meningioma → Benign tumor originating in meninges.
↳ Spinal meningioma → Compress Spinal Cord → Pain, numbness, weakness.
→ Cerebral meningioma → Seizure, Vision, muscle weakness.
Investigation: CT, MRI, Genetic Testing.

Von-Hippel-Lindau Disease

- Autosomal dominant disease, mutation in VHL Gene on chromosome 3 which is tumor suppressor gene.
→ Patient develops lesions in different systems like CNS, Kidney, adrenal glands
Benign ① Hemangioma → Most common 80%
↳ Cerebral or retinal
② Cyst & Cystadenoma → Ears, Male (Epididymis) Female (Broad ligament) or other areas

Malignant

Renal → Clear Renal cell Carcinoma.

Pancreas → Pancreatic Neuroendocrine tumours.

Adrenal → Pheochromocytoma → Benign.

Not every person will get every type of lesion.

Hydrocephalus

Water Head

→ Excessive buildup of Cerebrospinal fluid in the Brain..

→ Cause → ① Increased Production
② Decreased absorption
③ obstruction of circulation
From within (Obstructive) From outside (Communicating)

→ It may even cause due to rapidity.

Normal Pressure Hydrocephalus

→ Pressure on the Lumbar puncture normal.

CSF → Produced By choroid plexus.
↓
Lateral Ventricles
↓
Third ventricle
↓ Cerebral adequect
↓
Fourth ventricle
↓
Enters Subarachnoid space.

Types

① Primary Normal Pressure Hydrocephalus
↳ Idiopathic

② Secondary → Damage to arachoid villi
↓
Disrupts CSF reabsorption.
→ Subarachnoid Hemorrhage → Inflammation
→ Meningitis

Pathophysiology

↑ Ventricular volume → But Normal Pressure
↳ Compress nearby brain tissue.

① Corona radiata (Fibers carry sensory motor info between Body & Cerebral Cortex)
↓
Most affected one
Legs & Bladder.

② Limbic system (Emotion, Memory, Behavior)

C/F: 3 "W" ⇒ Wet, Wobbly, Wacky

Wet → Urinary Incontinence
Wobbly → Gait disturbance → wid Baseb gait
Wacky → Dementia.
↓ Emotional,
↓ Behavior,
↓ Memory,

Investigation → CT & MRI.
⇒ Lumbar puncture (Normal Pressure, 8-15 mm Hg)
Management → Lumbar puncture - Remove CSF.

Idiopathic Intracranial hypertension
(Pseudotumor cerebri).

⇒
⇒ ↑ IIP in the absence of tumor. hydrocephalus or any identifiable cause.
⇒ Unknown aetiology.
⇒ Associated with obese females and defect of CSF reabsorption in arachnoid villi.
C/F: ⇒ Headache, diplopia and visual disturbance. which might progress to swelling in optic disc and papilledema & Vision loss.
Investigation → CT & MRI, Lumbar puncture.