

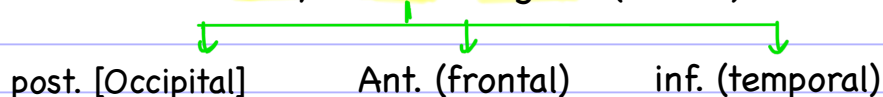
ventricular system and CSF

ventricular system → 2 lateral ventricle, 3rdV, 4th V

- the 2 lateral V. Join with the 3rd V. by interventricular foramina [of Mornio]
- the 3rd v. Join with the 4th V. by cerebral aqueduct (aqueduct of Sylvius in midbrain)

post. fossa (outlet) → 4th V:- central canal of the spinal cord and has 3 foramina in its roof with the sy arachnoid space [2 luschkas , 1Magendie]

The lateral ventricles:- has body, 3 horn, trigone (Atrium)



- * **the trigon:**
 - connect the body with the occipital horn and temporal horn..
 - common site of meningioma ..

meningioma نصيب ال cortex غالباً ، لكن اصابته ال ventricles
نادراً فداصبته ال تكون ال trigon ...

The 3rd ventricle - it's slit like cleft between 2 thalami

- in it's roof there is choroid plexus. (which produce the CSF)

The 4th ventricle - tent shaped cavity.

- Ant to the cerebellum and post. to the pons and superior half of the Mo.
 - has floor (rhomboid shaped) , roof, choroid plexus
 - * the roof is sup. and inf. medullary velums
 - * the choroid plexus is suspended from the inf. half of th of roof (PICA)

the Choroid plexus:

- in the lat. V
 - the Body:- medial, inferior
 - the inf. horn, medial, superior
- in the 3rd V. roof
- in the 4th V. inf. half of the roof.

subarachnoid space:-

- between the arachnoid and pia mater around the brain and spinal cord
- filled with CSF
- contain the large BV of the brain in the skull Base.
[Basal subarachnoid cisterns]
- in spine it ends at S2-S3



the spinal and
end at L1-L2



Cerebrospinal Fluid

تركيبة باريت

CSF clear color less normally.

Table 16-1 Cerebrospinal Fluid Physical Characteristics and Composition

Appearance	Clear and colorless
Volume Brain & spine	c. 150 mL
Rate of production	0.5 mL/min 20 mL/hr 500 mL/d
Pressure (spinal tap with patient in lateral recumbent position)	60-150 mm of water
Composition	
Protein	15-45 mg/100 mL
Glucose	50-85 mg/100 mL
Chloride	720-750 mg/100 mL
Number of cells	0-3 lymphocytes/mm ³

→ if there is obstruction in CSF pathways lead to cell death → ↑ ICP [hydrocephalus] in adult may lead to urgent surgery - adult die on one day child → survive

كل علم ان ضغط CSF ↑ لا نه الارتفاع يتحل الضغط العالي - مبرر اناسه سرور فكلما ردم في مفرجه حشانه فكلما تحافظ على ضغطه

Monro-Kellie Doctrine

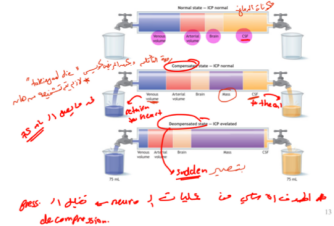
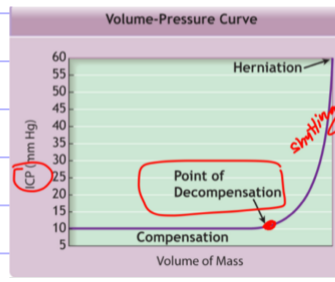


Table 16-2 Cerebrospinal Fluid Functions

1. Cushions and protects the central nervous system from trauma
2. Provides mechanical buoyancy and support for the brain
3. Serves as a reservoir and assists in the regulation of the contents of the skull
4. Nourishes the central nervous system
5. Removes metabolites from the central nervous system
6. Serves as a pathway for pineal secretions to reach the pituitary gland

regulation of the contents provide some nutrition بالضغط الجوي



CSF formation:- inside the ventricular system mainly in

1. choroid plexuse [active secretion need transport and energy] not pressure regulated
2. ependymal cell 3. Brain

CSF circulation: 1st V → 3rd V → 4th V → Subarachnoid space in Brain...

CSF absorption; in arachnoid villi (granulations) esp. in sup. Sag. sinus.

- * occur when CSF pressure exceeds the venous pressure in the sinus.
- * one way valve.
- * CSF absorption controls CSF pressure.

obstruction of arachnid villi due to infection or truma.

oxidative, protein, meningitis, villi, Subarachnoid hemorrhage, villi, Communication

non communicating hydrocephalus:- 4th V, Communication between SAC, 4th V.

Blood Brain and Blood CSF Barriers:-

- the CNS require very stable environment to do the
- this is provided by isolating the NS from the B. by these barriers.
- and they protect the brain and spinal cord from potentially harmful subs. while permitting gases and nutriment to enter the nerous tissue

تکلم به قبول و خروج، المعاد

BBB;- structure;- endothelial cell (tight junction lipid)

Basment membrane, foot processes of the astrocyte.

in new born the BBB is more permeable so the Bill, can enter

* جلد به رسم Jundice و دخول از Bill راجع به خطری از مغز به عصب الكبار
 میت از Bill به سطح اختراق از BBB in the adult ..

size of molecules

lipid solubility

* بعد تفاذیم از BBB ←

the BBB absent in :- pineal gland- tuber cinereum - wall of the optic recess
 post. lobe of pituitary -area postrema

the BBB is disrupted in:- brain traumatic infl-toxic inj... malignant brain tumor
 chronic or large dose of antibiotic.

Drugs crosses Blood brain barrier

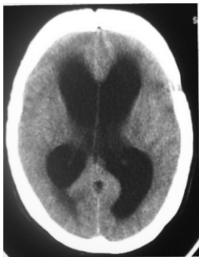
Different ways

E.g.
 Antidepressant: Reboxetine, Viloxazine
 Antifungal: Amphotericin B, 5-flucytosine, Voriconazole, Itraconazole, Fluconazole
 Antiparasitic: Pyrimethamine, Alendazole, Praziquantel
 Antibiotic: Aminoglycosides, Macrolides, B-lactam, Fluoroquinolones,
 Cephalosporins, Doxycycline, Minocycline, Quinolone
 Others: Endorphins, Serotonin, Histamine, Chlorpromazine, Epinephrine

Blood CSF Barriers:-

structure;- endothelial cell with closed fenestrations, BSM, scattered pale cells
 BSM, choroidal epithelial cells (tight junction not in vess, but in the cuboidal cells)

CSF Brain interface: A comparable. Physiologic barrier between CSF and CNS EC compartment doesn't exist



active hydrocephalus symptomatic.

clinical Notes ① papilledema: optic disc swelling in the eye base

↑ICP → ↑CSF → compression of retinal vein BL → optic disc swelling BL → on atrophy, blindness if presistent.

② Hydrocephalus:- ① high CSF formation

② Blockage of CSF circulation [tumor, AS] non communicating HCP

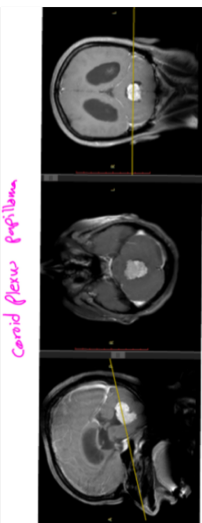
③ ↓ CSF absorption [post meningitis, sinus thrombosis] communicating HCP

CSF analysis in meningitis

← عصب نهج از infection میفرایند در CSF ..

Tuberculosis	Fungal	Viral	Bacterial	Normal	در حد طبیعی
Variable	Elevated	Normal or slightly elevated	Elevated	5-20	Opening pressure cm H ₂ O
10 - 1000	10 - 1000	25 - 2000	> 1000	< 5	Leukocytes
Lymphocyte predominance	Lymphocyte predominance	Early: Neutrophils Late: Lymphocytes	Neutrophil predominance not lymphocyte	0	Cell differential and if it present mainly lymphocyte
Very High	High	Normal or slightly elevated	High	15 - 45	Protein
Low	Low	Normal	Low	45 - 85	Glucose
+	+	-	+	-	Cultures

lumbar puncture not for patient with tumor [because there is ↑ P]



common in children ← **4th V. tumors.** ① medullary blastoma:-most common and arise from the roof

Brain stem cere bulundus i of 4 th V.

② ependymoma: arise from the floor of 4th V (from Brain stem) can invade hypoglossal and vagal nuclei, affecting movment of the tounge, swallowing, respiration, heart rate, BP.....