



Lecture 9:

Meningitis



OBJECTIVES

- Pathology of pyogenic Meningitis
- Brain abscess
- Epidural and subdural infections
- CNS T.B
- Viral meningitis



How infections enter CNS :

Hematogenous spread (the most common)

Directly (e.g. by trauma or congenital CNS malformation)

Local extension (secondary to infection in other place e.g. sinusitis or otitis)

The peripheral nervous system certain viruses Rabies (transmitted by saliva of the rabid dog) and herpes zoster.

1- MENINGITIS:

An inflammation of the leptomeninges*and CSF within the subarachnoid space.

Complications of meningitis:

- 1- Vasculitis and may lead to ischemia.
- 2- Brain abscess.
- 3- Leptomeningeal fibrosis may leads hydrocephalus.
- 4- Waterhouse–Friderichsen syndrome (WFS): due to hemorrhage to adrenaline glands .
- 5- Focal cerebritis & seizures.
- 6- Cognitive deficit.
- 7- deafness.

*Leptomeninges= pia matter + arachnoid matter

*Meningitis don't be confused with Meningoencephalitis



2- brain abscess :*

- ❖ The Most common organisms cause brain abscess in non-immunosuppressed people are **Streptococci and staphylococci**.
- ❖ The most common site for brain abscess is the cerebral hemisphere.
- ❖ **Predisposing conditions for brain abscess :**
 - I. Endocarditis by emboli released
 - II. congenital heart disease (right-to-left shunt)
 - III. Bronchiectasis
- ❖ **Clinical present with:**
 - A. Focal neurological deficits
 - B. Increased intracranial pressure
- ❖ **Morphology of brain abscess:**
 - A. Liquefactive necrosis.
 - B. edema and congestion surrounding brain.
 - C. reactive astrocytes.
 - D. perivascular inflammatory cells.
- ❖ **CSF findings:**
 1. Contains only scanty cells (color of CSF is NOT yellowish and there is NO pus)
 2. increased protein level
 3. Normal glucose level
- ❖ **Complications : meningitis and Herniation**

Note : meningitis may leads to brain abscess also brain abscess may leads to meningitis

* A type of space occupying lesion. The others are hemorrhage and tumors



3-Epidural:

- ❖ An adjacent infection, such as **sinusitis** may leads to **epidural abscess**, it is commonly associated with **osteomyelitis**.
- ❖ When the abscess occurs in the spinal epidural space, it compress leads to neurosurgical emergency.

4- subdural:

- ❖ **subdural empyema is:** an abscess of the subdural space contains pus.
- ❖ May arise from Infections of the skull or air sinuses.
- ❖ **treatment by:** surgical drainage.

Note:

- Subdural empyema could lead to infarction of the brain
- large subdural empyema may produce a mass effect
- arachnoid and subarachnoid spaces are usually unaffected

5- T.B of the brain:

Is fibrinous exudate of the subarchnoid space mostly at the base of the brain.

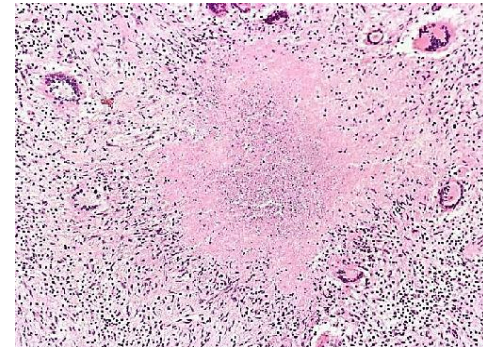
-Tuberculoma:

is well-circumscribed intraparenchymal mass.

- 1- Rupture leads to tuberculus meningitis.
- 2- Always occurs after hematogenous dissemination
- 3- may cause significant mass effect

- Microscopic examination:

- 1- central core of caseous necrosis
- 2- surrounded by a typical tuberculous granulomatous reaction.



CSF findings:

increased pleiocytosis (polymorphonuclear and mononuclear)

Increased protein level

normal or little decrease glucose level _



6-Aseptic meningitis (viral meningitis):

- ❑ It is less dangerous than pyogenic meningitis (bacterial meningitis) because it is usually **self-limiting**.

- ❑ **The most common organisms:**
enterovirus

- ❑ **On microscopic examination:**
1- there is either no recognizable abnormality .
2- or a mild to moderate infiltration of the leptomeninges with lymphocytes.

- ❑ **CSF findings:**
 - Increased number of lymphocytes (pleiocytosis).
 - Little increase in protein level.
 - Normal glucose level

Homework

CSF findings

<u>The disease</u>	<u>Pyogenic Meningitis</u>	<u>Brain abscess</u>	<u>T.B meningitis</u>	<u>Aseptic meningitis</u>	<u>M.S</u>
Appearance	Cloudy	—	Cloudy less than Pyogenic	Clear	Clear
Protein level	increased	Increased	Increased	Little increased	Normal
Glucose level	Decreased	normal	Decreased	normal	—
Cells differential	neutrophils	Scanty cells	Lymphocytes	Lymphocytes	Increased IgG

❖ What is Meningoencephalitis?

Meningitis + encephalitis, inflammation of the meninges and brain. Called also: **Encephalomeningitis**

MCQs

1- What is the most common route of the infection in entering the CNS?

- A-Hematogenous spread
- B-Direct trauma
- C-Through the peripheral nervous system
- D-Local extension

2- What is The most common pathogens that can cause brain abscesses?

- A-Streptococci.
- B-Staphylococci
- C-E.colli
- D-A AND B

3- What is the level of glucose in CSF of patient with brain abscesses?

- A-normal.
- B-very high.
- C-low.
- D-very low

4- what is the type of necrosis in brain abscesses?

- A-caseus.
- B-liquefactive
- C-fibrinoid
- D-non-of the above

5- what is the type of necrosis in brain tuberculoma?

- A-caseus.
- B-liquefactive
- C-fibrinoid
- D-non-of the above

6- which one of the following is a complication of meningitis?

- A-hydrocephalus
- B-focal cerebritis
- C-cerebral abscess.
- D-all

Ans: 1-A 2-D 3-A 4-B 5-A 6-D



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