

Pathology

Practical Summary



439

اللهم لا سهل الا ما جعلته سهلا وانت
تجعل الحزن اذا شئت سهلا

DISCLAIMER!!!

This is done by the effort of students and may fall short of what will actually come on the exam. You are expected to have studied the theoretical material and the whole practical file before going into the exam.

This is to be used for revision, it contains what we have deemed important from what the doctor had said.

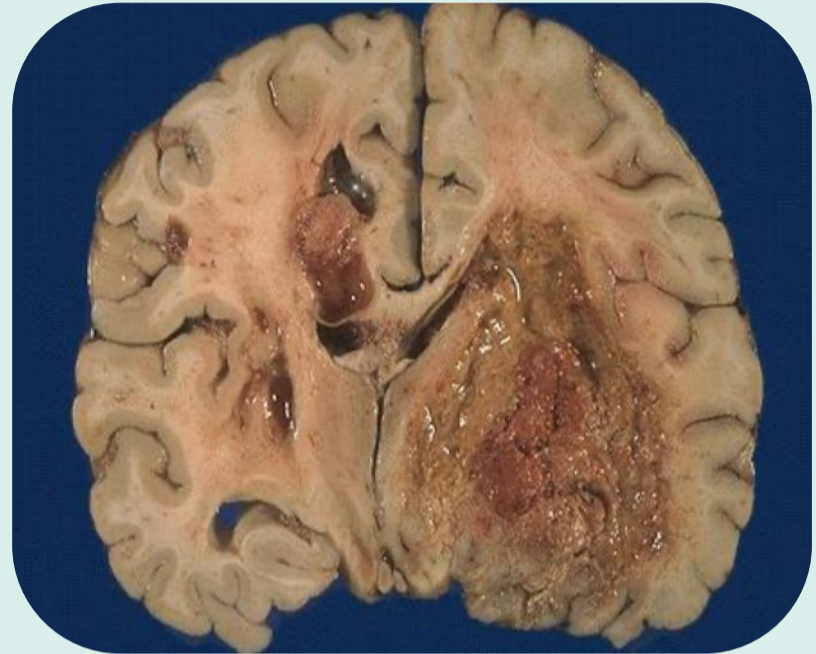
We are not held liable or responsible for any content in the exam out of this file.

Thank you and good luck.

Glioblastoma

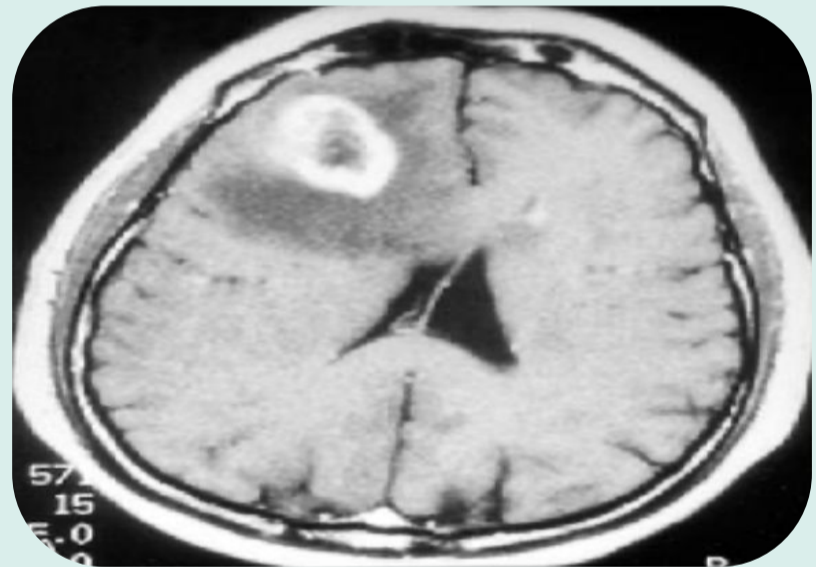
(previously called Glioblastoma Multiforme, and sometimes still abbreviated GBM)

- ❖ This is the worst possible form of Glioma—a Glioblastoma multiforme (GBM). These neoplasms are quite vascular with prominent areas of necrosis and hemorrhage. Note how this one has crossed the midline to the opposite hemisphere



Glioblastoma Multiforme - Gross

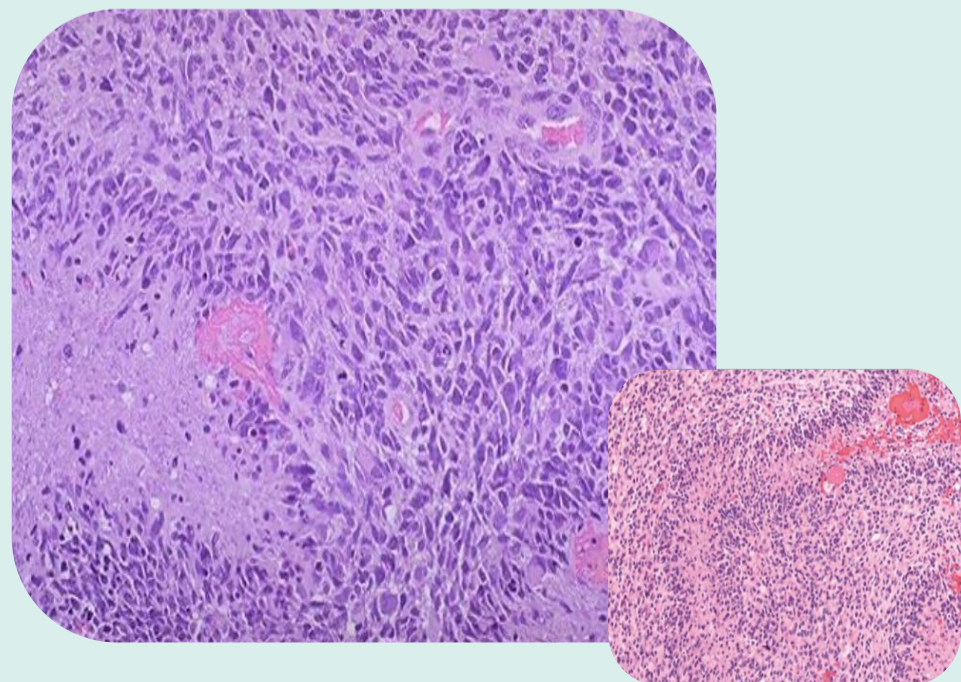
- ❖ Computed tomographic (CT) scan of a large **intra-axial tumor** in the cerebral hemisphere showing **signal enhancement** with contrast material and pronounced **peritumoral edema**.



Glioblastoma Multiforme – CT scan

- ❖ **Small pic:** Glioblastoma. Foci of necrosis with pseudopalisading of malignant nuclei and endothelial cell proliferation.

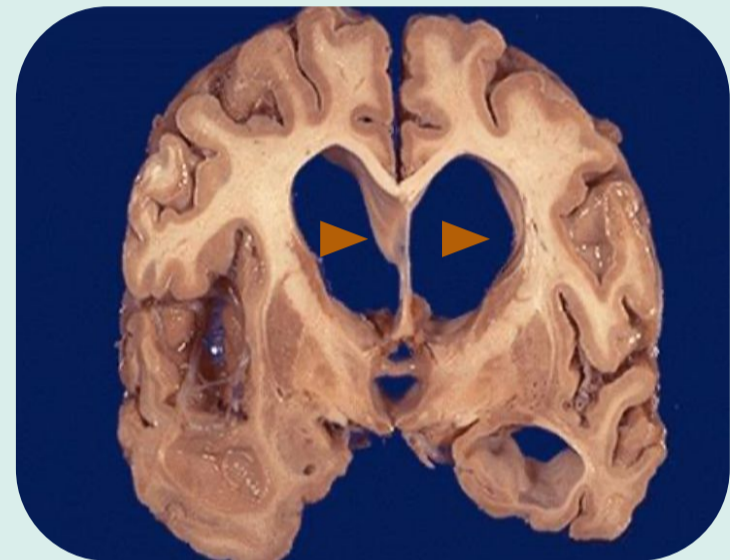
- ❖ **Large pic:** This glioblastoma multiforme (GBM) demonstrates **marked cellularity with marked hyperchromatism and pleomorphism**. Note the **prominent vascularity as well as the area of necrosis at the left with neoplastic cells palisading around it**.



Glioblastoma Multiforme – HPF / LPF Microscopy

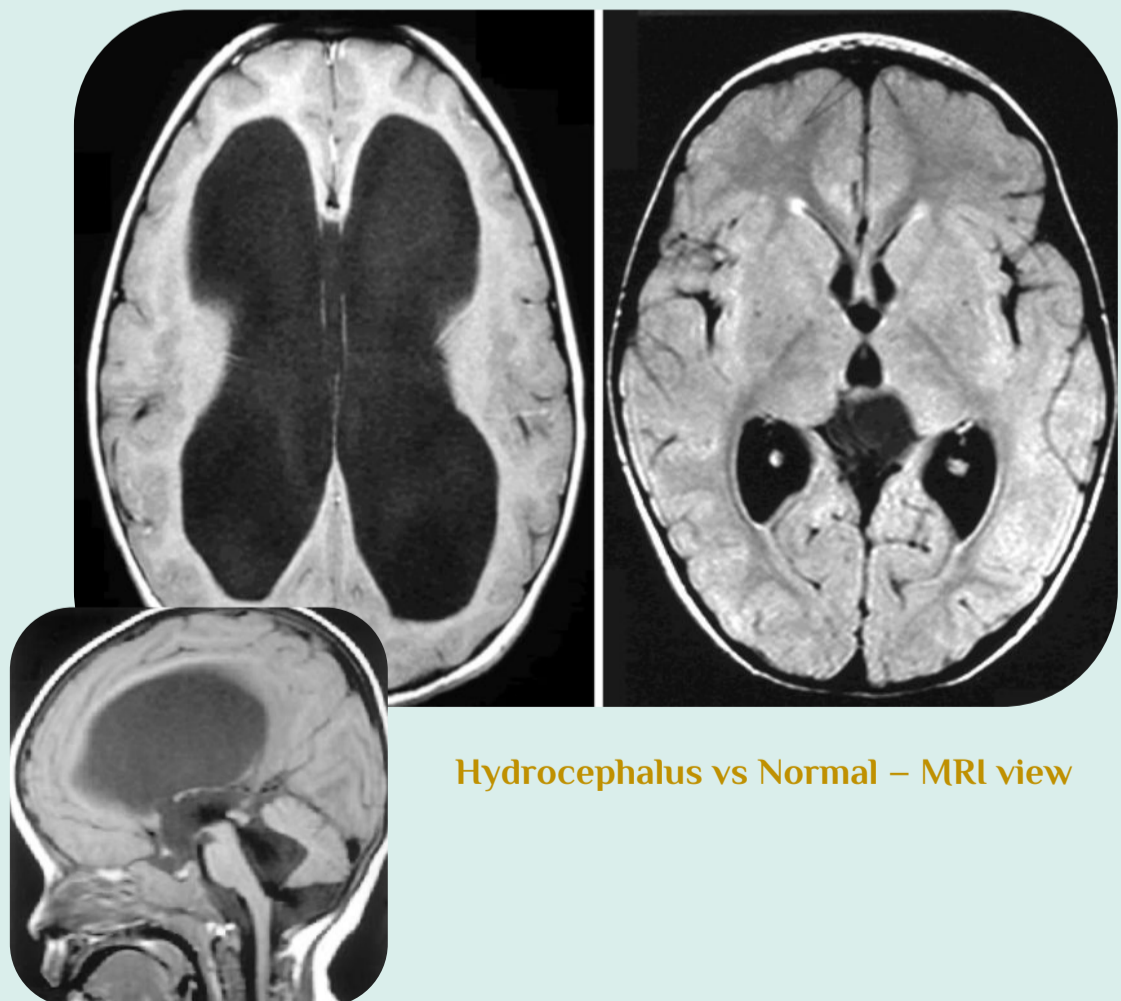
Hydrocephalus

- ❖ **Definition:** Hydrocephalus refers to the accumulation of excessive CSF within the ventricular system
- ❖ Most cases occur as a consequence of impaired flow or impaired reabsorption of CSF
- ❖ This is hydrocephalus. Note the **marked dilation of the cerebral ventricles**. Hydrocephalus can be due to lack of absorption of CSF or due to an obstruction to flow of CSF.



Hydrocephalus – Gross

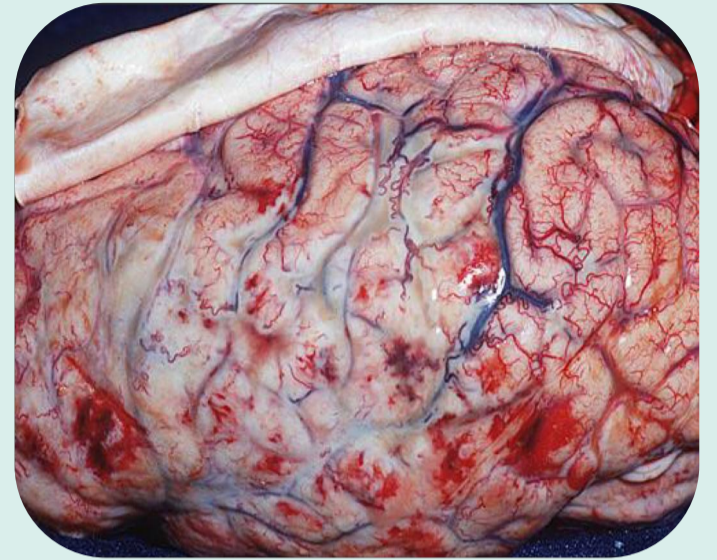
- ❖ An MRI scan of a brain with hydrocephalus (left) and a normal MRI scan (right). **The large dark area on the left is the ventricles, made bigger by a build-up of CSF**
- ❖ **Small pic:** Mid Sagittal MRI of a child with communicating hydrocephalus, involving all ventricles



Hydrocephalus vs Normal – MRI view

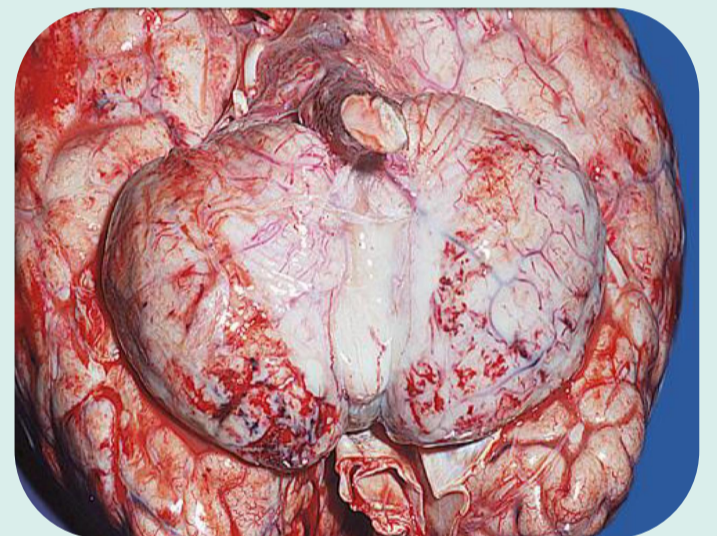
Bacterial meningitis

- ❖ **Definition:** Bacterial meningitis is the infection of the arachnoid membrane, subarachnoid space, and cerebrospinal fluid by bacteria.
- ❖ A creamy purulent exudate covers the cerebral hemispheres



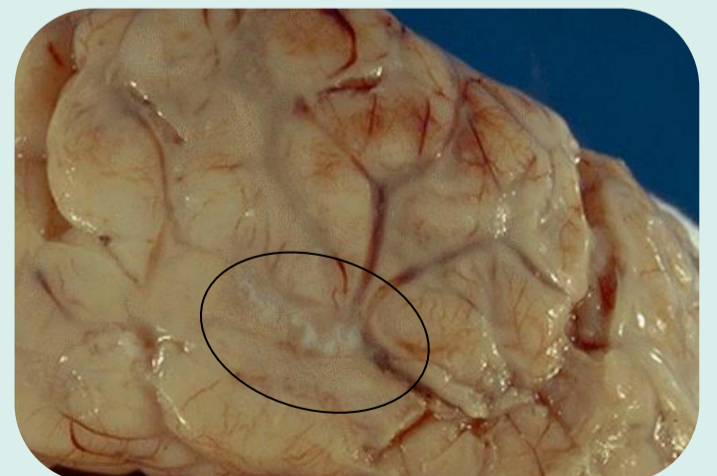
Bacterial meningitis – Gross

- ❖ A creamy purulent exudate covers the cerebral hemispheres and settles along the base of the brain, around cranial nerves and the openings of the fourth ventricle



Bacterial meningitis – Gross

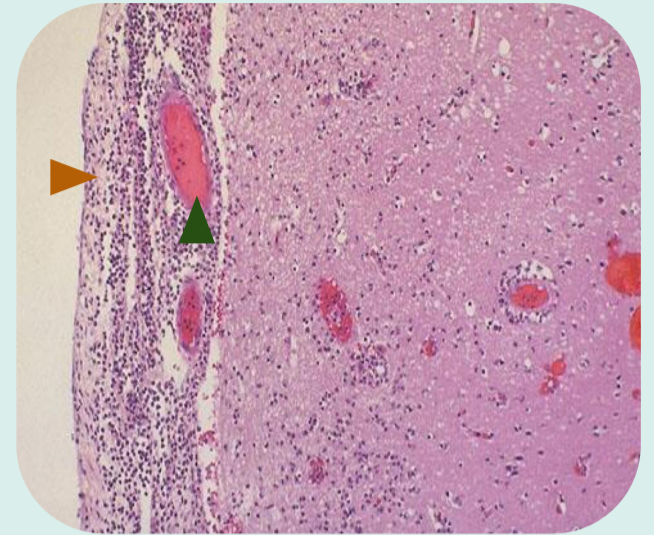
- ❖ Here is another example of an acute meningitis from bacterial infection
- ❖ **C.S.F finding of bacterial meningitis:** The cerebrospinal fluid in such cases typically has a **low glucose, high protein, and many PMN's** . A gram stain should be done to identify organisms



Acute Bacterial meningitis – Gross

Bacterial meningitis

- ❖ A **neutrophilic exudate** is seen involving the meninges at the left, with prominent **dilated blood vessels**. There is edema and focal inflammation (extending down through the Virchow-Robin space) in the cortex to the right. This acute meningitis is typical for bacterial infection



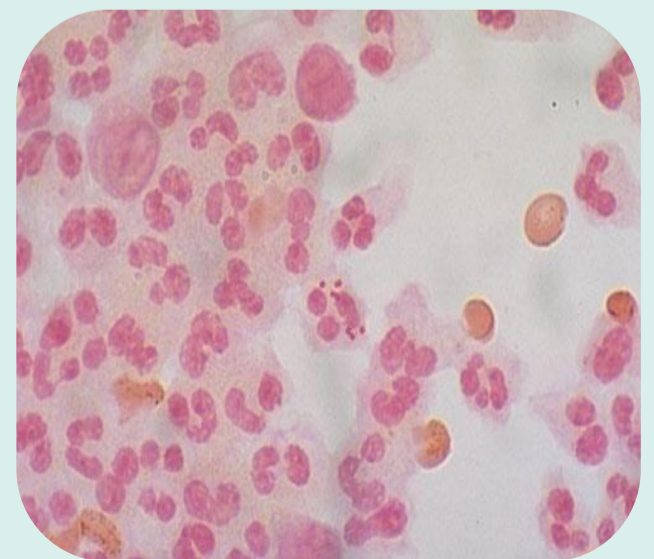
Bacterial Meningitis LPP Microscopy

- ❖ **Complication of BM** :Neutrophils in the subarachnoid space infiltrate and damage cranial nerves resulting in cranial nerve deficits, and invade leptomeningeal vessels causing phlebitis and arteritis with thrombosis and ischemic infarction



Bacterial Meningitis LPP Microscopy

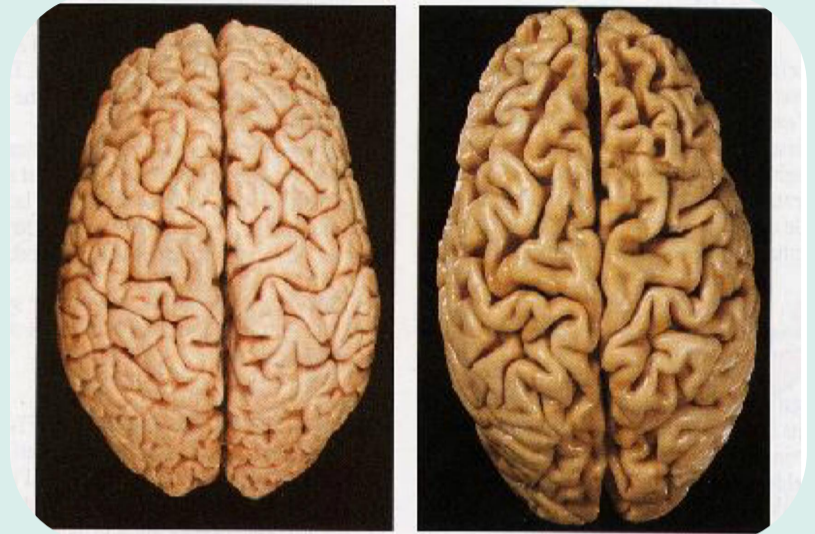
- ❖ **Gram stain of CSF sample** : microscopically reveals gram negative diplococci within a neutrophil, typical for *Neisseria meningitidis*



Bacterial Meningitis- CSF gram stain

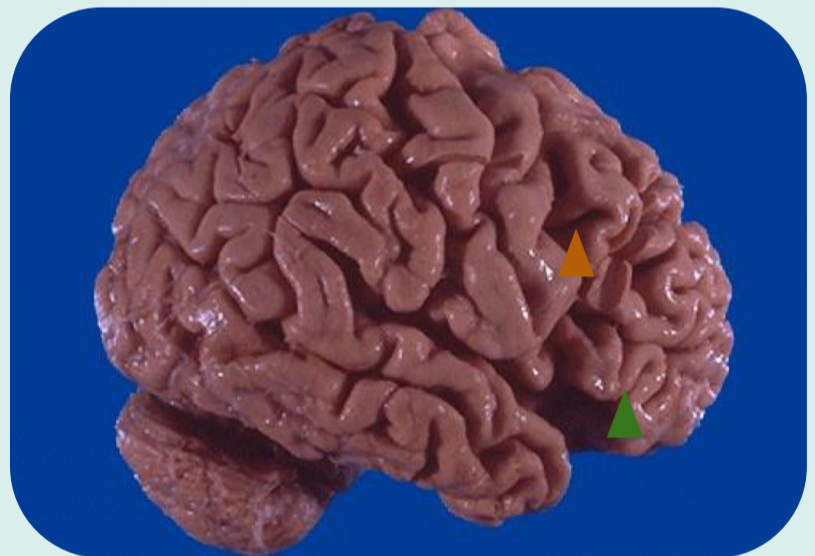
Alzheimer

- ❖ A : Normal Brain
- ❖ B :The brain of a patient with Alzheimer shows **cortical atrophy** with **thin gyri and prominent sulci**



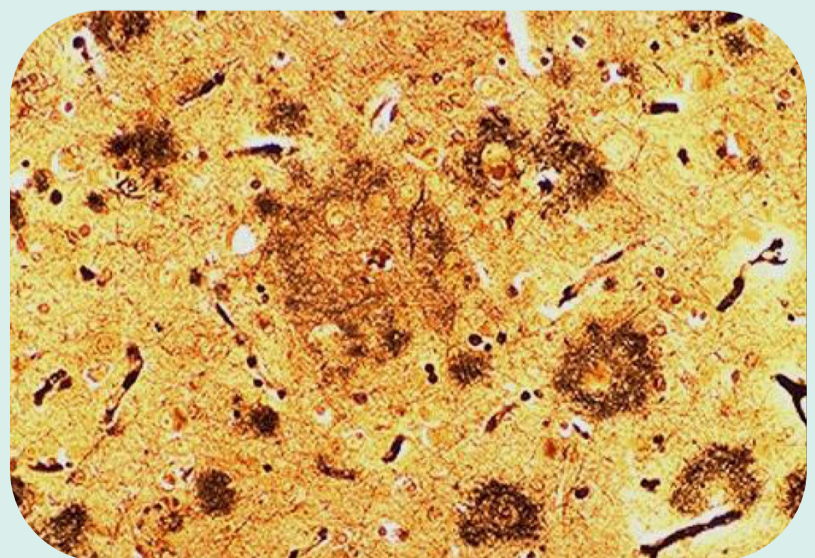
Healthy Brain vs Alzheimer's Brain -Gross

- ❖ **Gross feature:** The cerebral atrophy seen here mainly in the frontal and parietal regions is characterized by **narrowed gyri** and **widened sulci**. The atrophy seen here was due to senile dementia of the Alzheimer's type (Alzheimer's disease).



Alzheimer's Brain -Gross

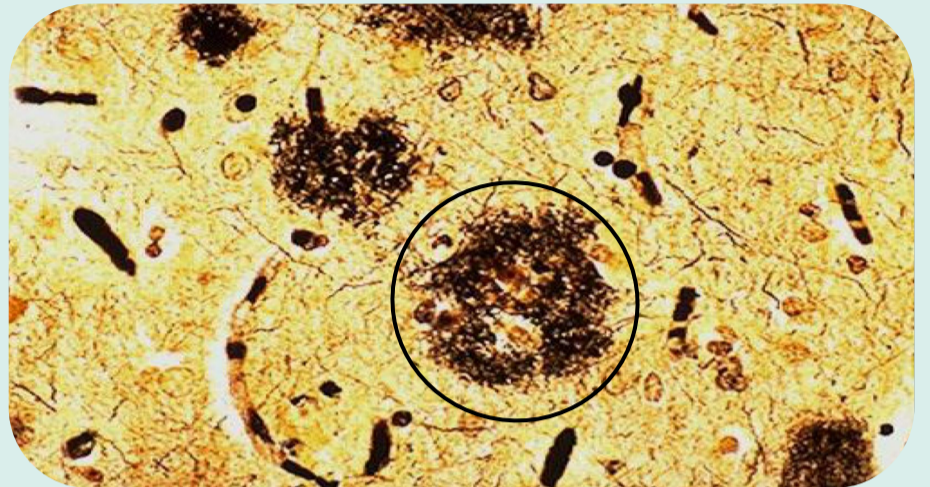
- ❖ The characteristic microscopic findings of Alzheimer's disease include **"senile plaques"** which are collections of degenerative presynaptic endings along with **astrocytes** and **microglia** often around a central amyloid core. These plaques are best seen with a **silver stain**.



Alzheimer's disease Neuritic plaques - LPf

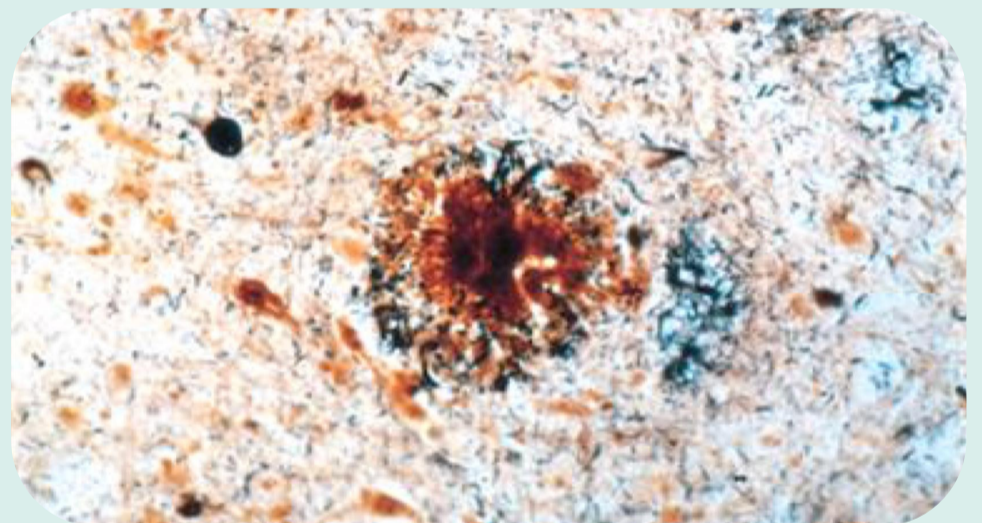
Alzheimer

- ❖ The plaques of Alzheimer's disease are seen here with a **silver stain**. Such **neuritic (senile) plaques** are most numerous in the cerebral cortex and hippocampus. This dementia is marked mainly by progressive memory loss



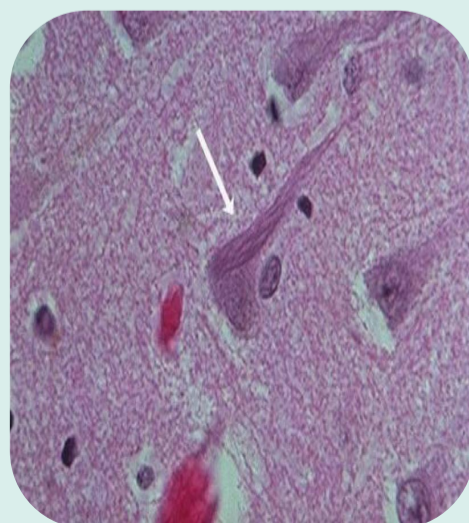
Alzheimer's disease Neuritic plaques - LPf

- ❖ Alzheimer disease. A **neuritic (senile) plaque** with a rim of dystrophic neurites surrounding an amyloid core.



Alzheimer's disease Neuritic plaques - LPf

- ❖ Alzheimer Disease. **Neurofibrillary tangles** (arrows) are present within the neurons. They are composed of cytoskeletal intermediate filaments.



Alzheimer's disease Neurofibrillary tangles - HPF



QUIZ!

Case 1

A 55 years old man complained of headache for the last 2 months . Brain MRI reveals a 3 cm frontal intra - parenchymal (intra-axial) space occupying lesion with rim enhancement on contrast studies.

1. What's the diagnosis ?

Glioblastoma

2. What are the origin of the cells ?

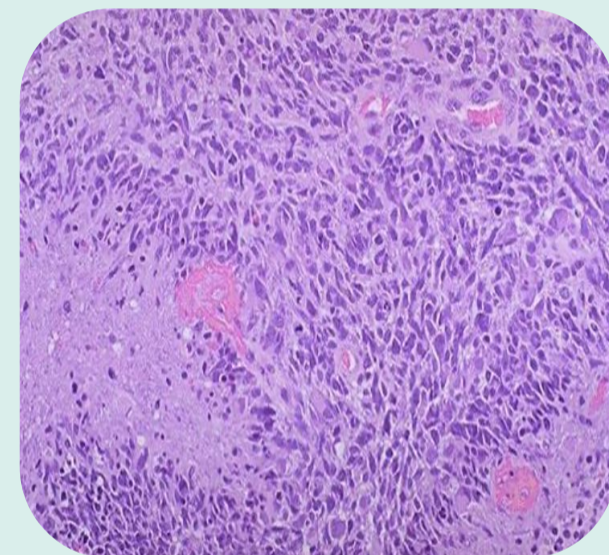
Astrocyte

3. Describe the CT scan.

A large intra-axial tumor in the cerebral hemisphere showing Peripheral enhancement and pronounced peritumoral edema with contrast material

4. Describe the histopathology.

Marked cellularity with marked **Nuclear hyperchromatism** and **Nuclear pleomorphism**. There is prominent vascularity as well as area of **necrosis** at the left with neoplastic cells palisading around it.



Case 2

A 9 months infant was suffering from enlarged head size and admitted to hospital with convulsions, went into coma and died. Autopsy was done and the brain was large with dilated ventricles .

1. What's the diagnosis ?

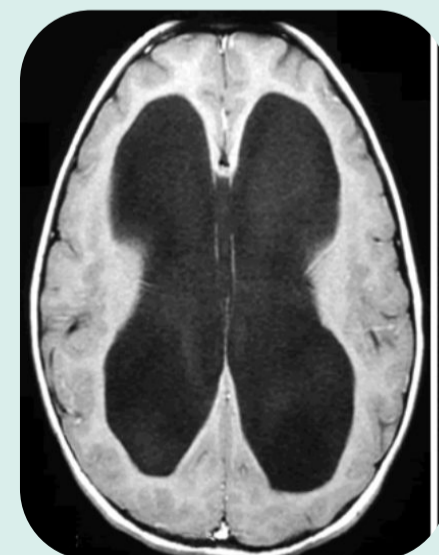
Hydrocephalus

2. Describe the clinical presentation

Big head and Bulging sagittal sinus and veins.

3. Describe the MRI scan.

Markedly dilated lateral ventricles



4. What are the causes?

Lack of absorption of CSF or due to an obstruction to flow of CSF. In rare instances overproduction of CSF may be responsible (e.g. tumors of the choroid plexus)

Case 3

4 years old child who was treated from otitis media and suddenly complained from headache, vomiting, fever and stiff neck. CSF was found to be clouded with abnormal increase of neutrophils, increased protein and absence of sugar. Gram stain of the CSF fluid showed meningococci .

1. What's the diagnosis ?

Acute bacterial meningitis

2. What's the best specimen that should be collected if meningitis was suspected ?

Cerebrospinal fluid (CSF) ; by Lumbar puncture

3. What are the findings of the CSF in bacterial meningitis?

Clouded with abnormal increase of neutrophils, increased protein and absence of sugar

4. Describe the gross feature.

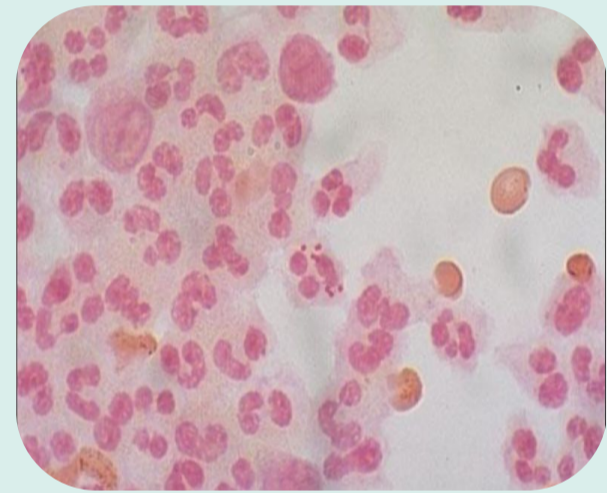
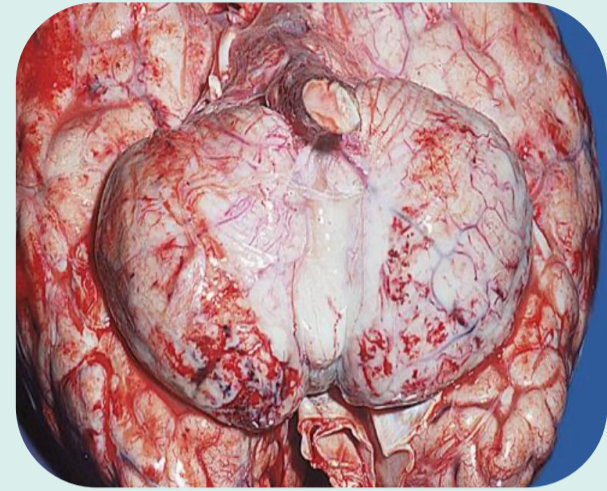
A creamy purulent exudate or pus covers the cerebral hemispheres and settles along the base of the brain

5. Describe the Microscopic feature of the gram stain.

Sample reveals gram negative diplococci within a neutrophil, typical for *Neisseria meningitidis*

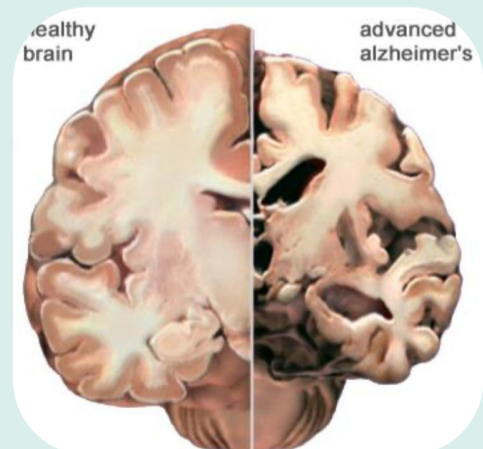
6. What is the cause of the chronic form of the diagnosis you mentioned?

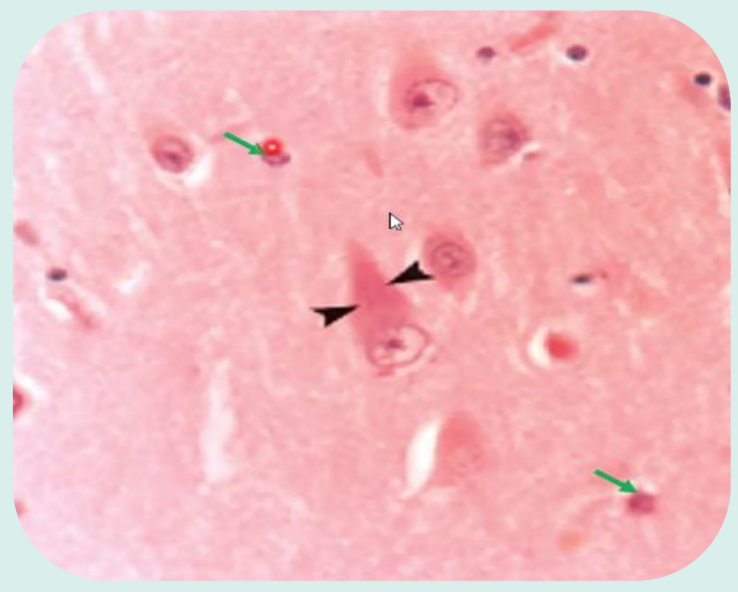
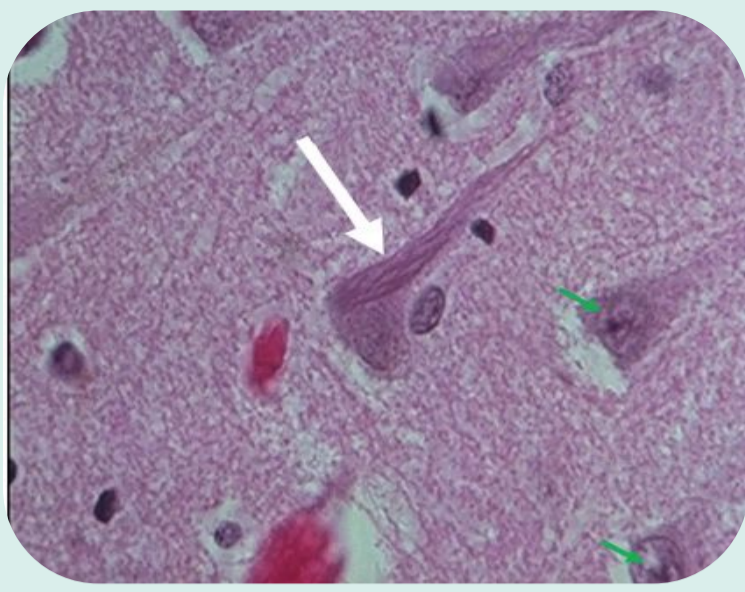
Mycobacterium Tuberculosis and spirochetes



Case 4

A 85 years old man complains of progressive loss of memory, disorientation and alterations in mood and behavior since 20 years. He was admitted to hospital because he was disabled and immobile and he died in hospital after one week of admission. Autopsy was done and the brain cortex was found to be atrophied.





1. What's the diagnosis ?

Alzheimer disease

2. Describe the gross feature.

Cortical atrophy with thin gyri and prominent sulci

3. What are the extra/Intra cellular abnormalities called? And what is the stain called?

Extracellular: Senile plaques around a central beta amyloid.

Intracellular: Tangles composed of cytoskeletal intermediate filaments.

They are seen with silver stain

4. Describe the microscopic feature; Green, white, black arrows.

Black: Neurofibrillary tangles

White: Neurofibrillary tangles (in more clear section)

Green in right photo: Microglia

Green in left photo: Neurons

Good luck !