

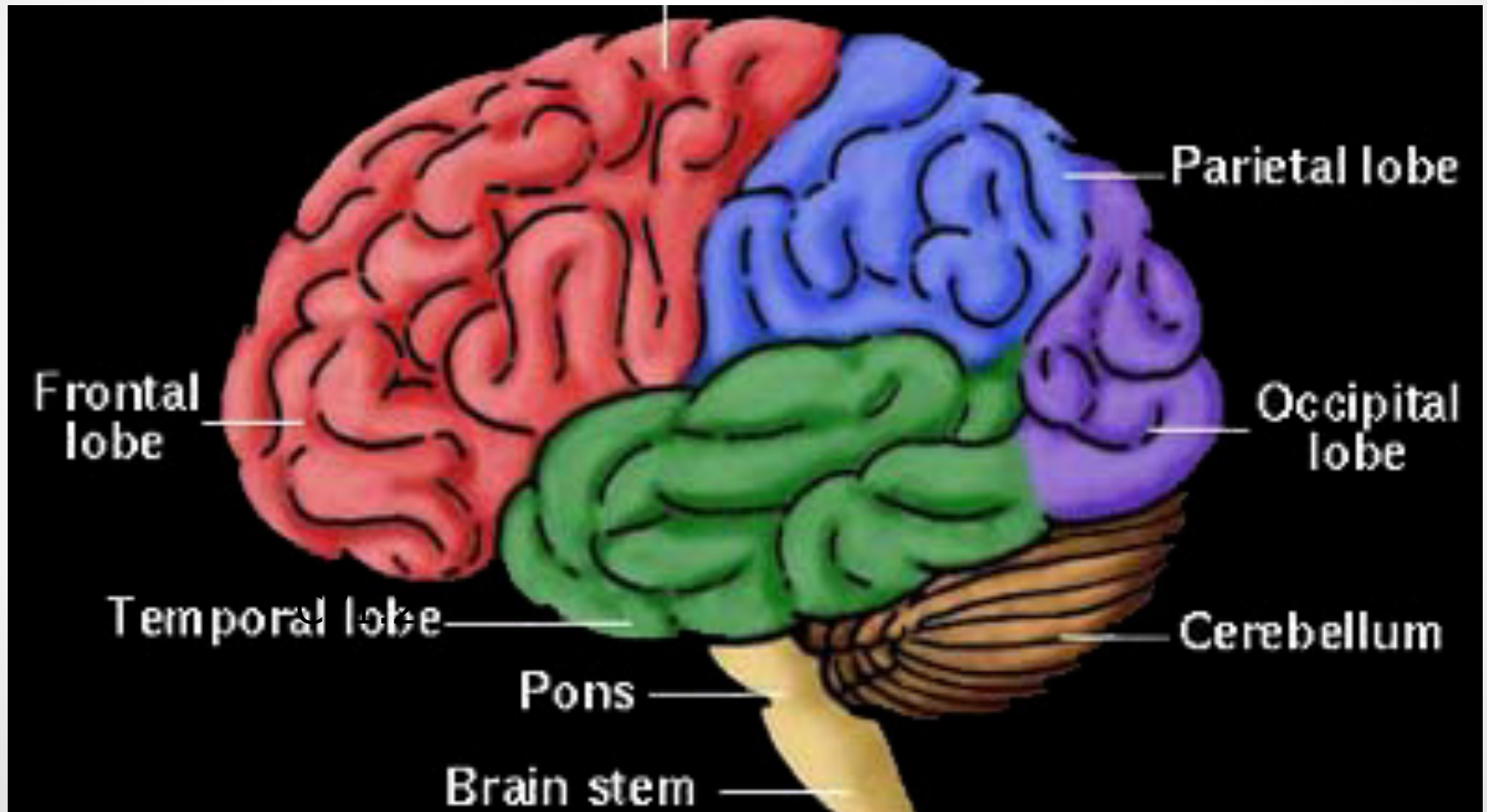
# Central nervous system block Neuropathology practical

Dr. Maria A. Arafah

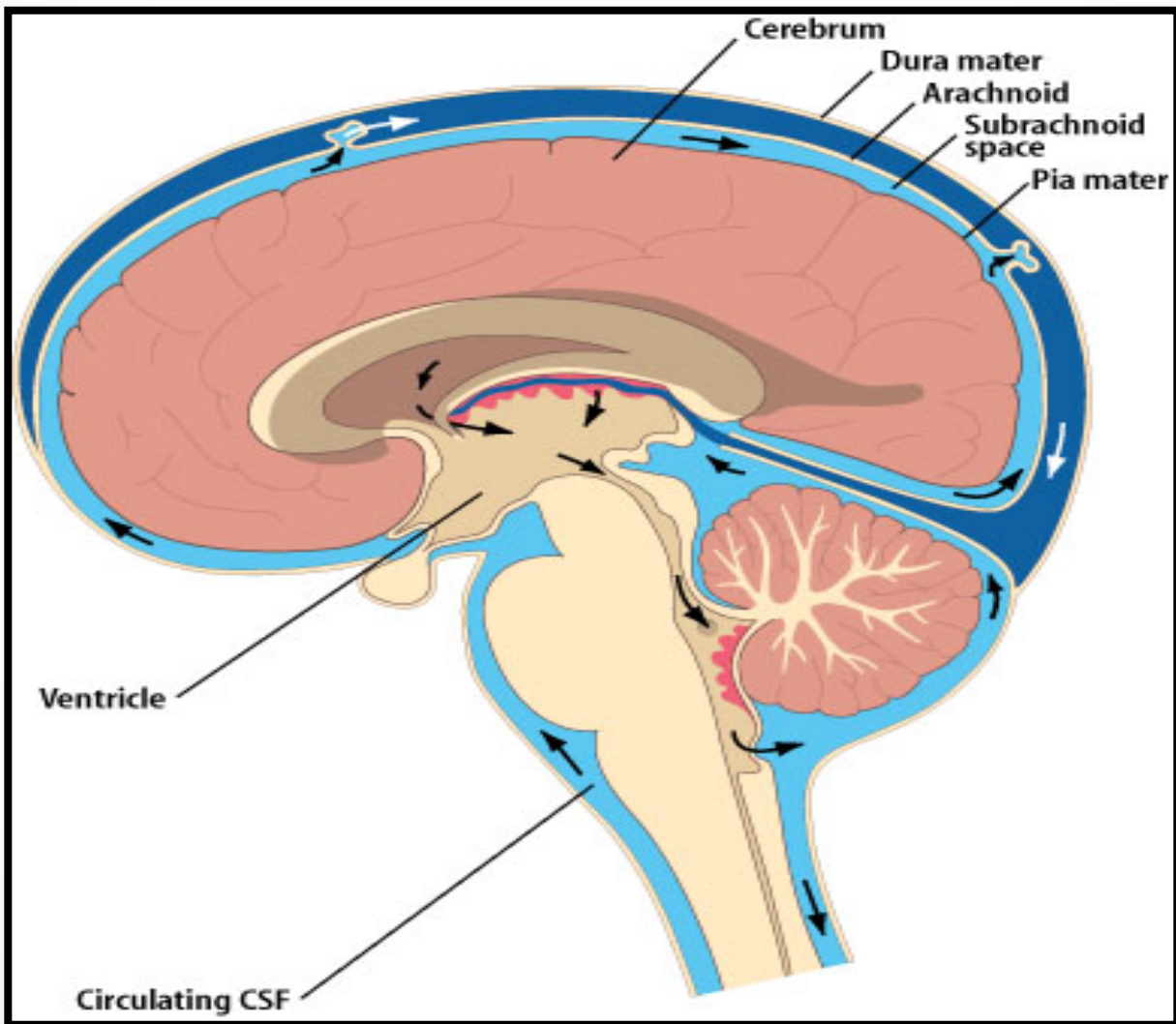
Assistant Professor – Department of Pathology

<http://fac.ksu.edu.sa/mariaarafah/courses>

# Cerebrum, Cerebellum and Brain Stem



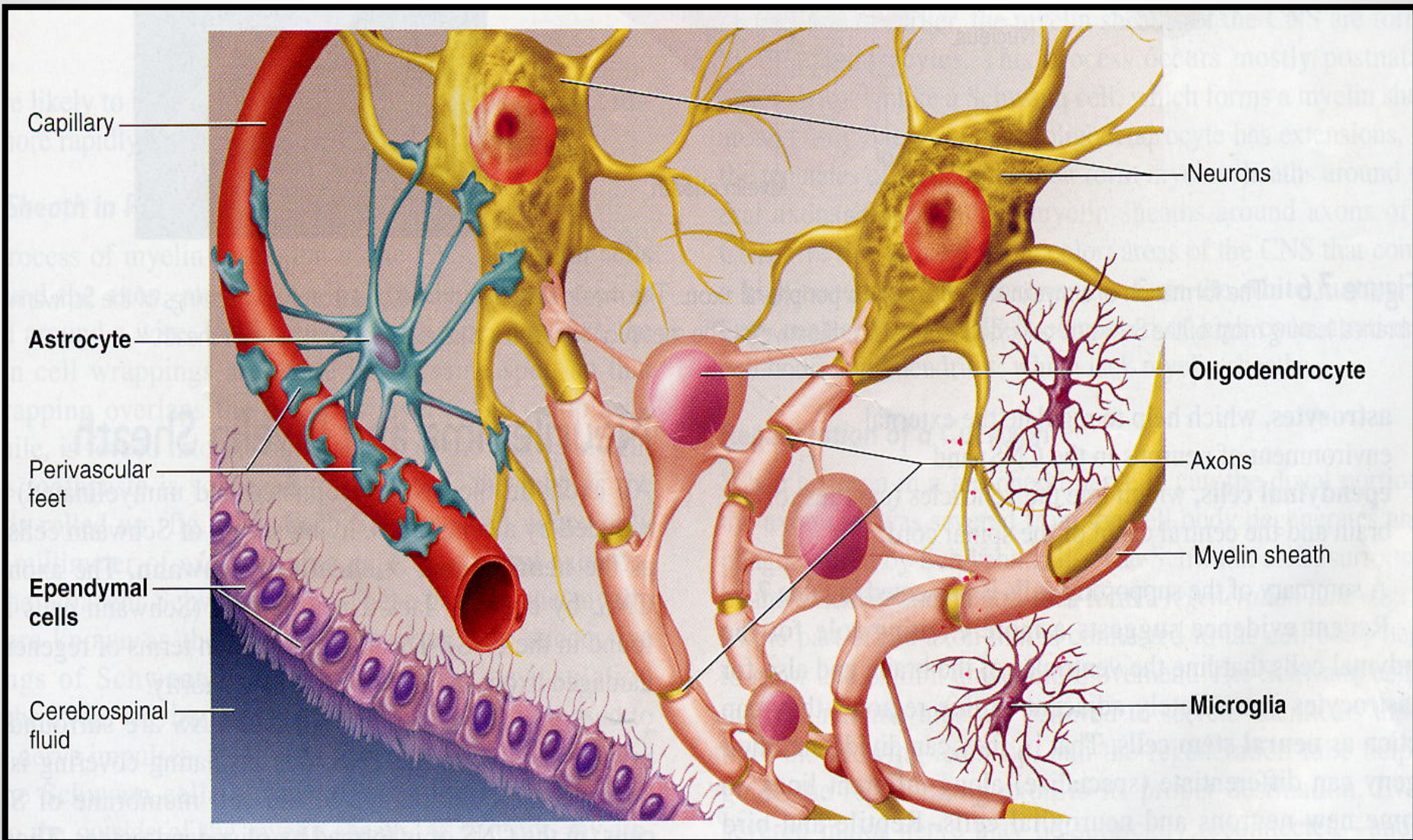
# Meninges



# CNS Cells

- Two cell types
  - Neurons
    - Conduct nerve impulses
    - Cannot be replaced if destroyed
  - Neuroglial cells
    - Support, nourish, and protect the neurons
    - Include astrocytes, oligodendrocytes, ependymal cells and microglia

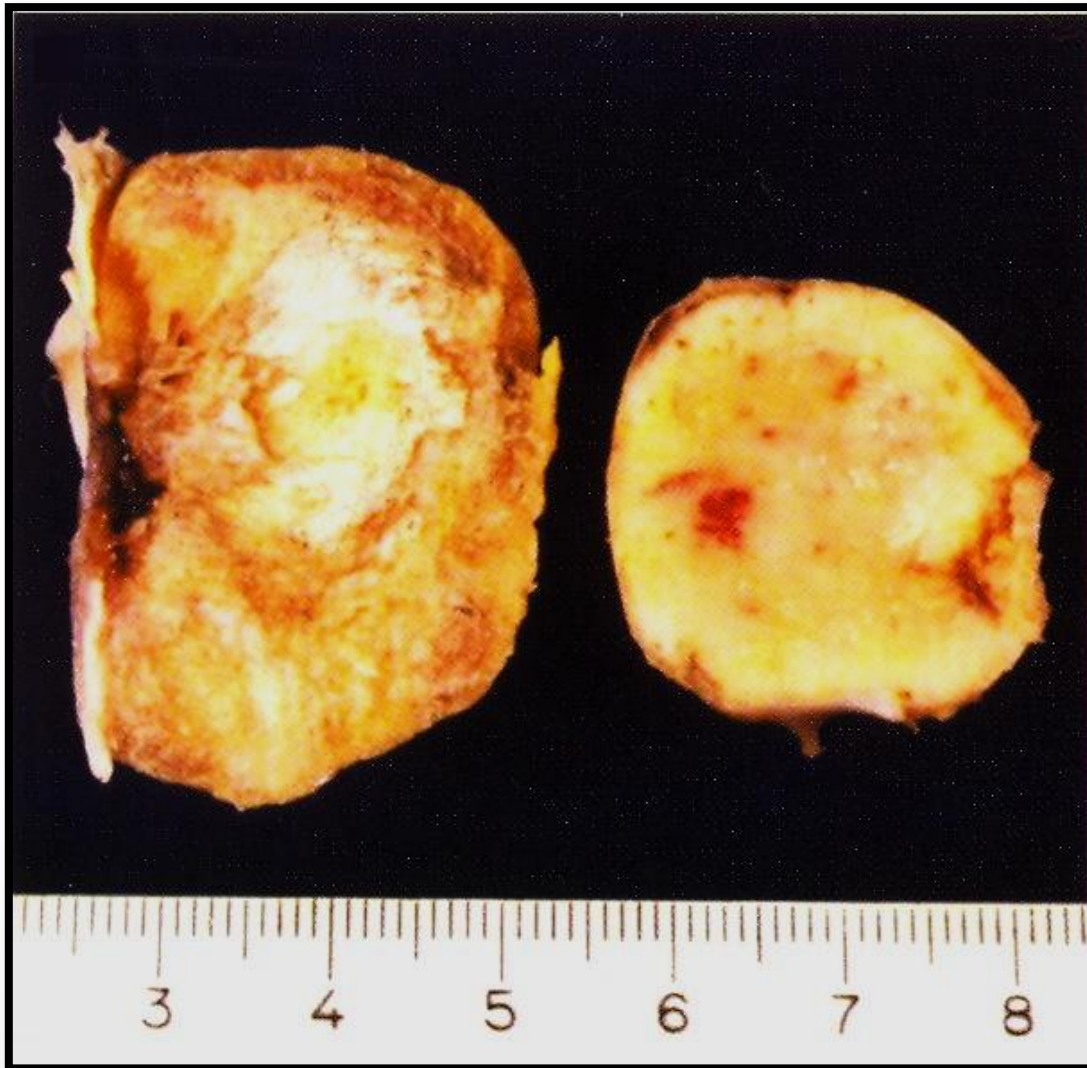
# CNS Cells



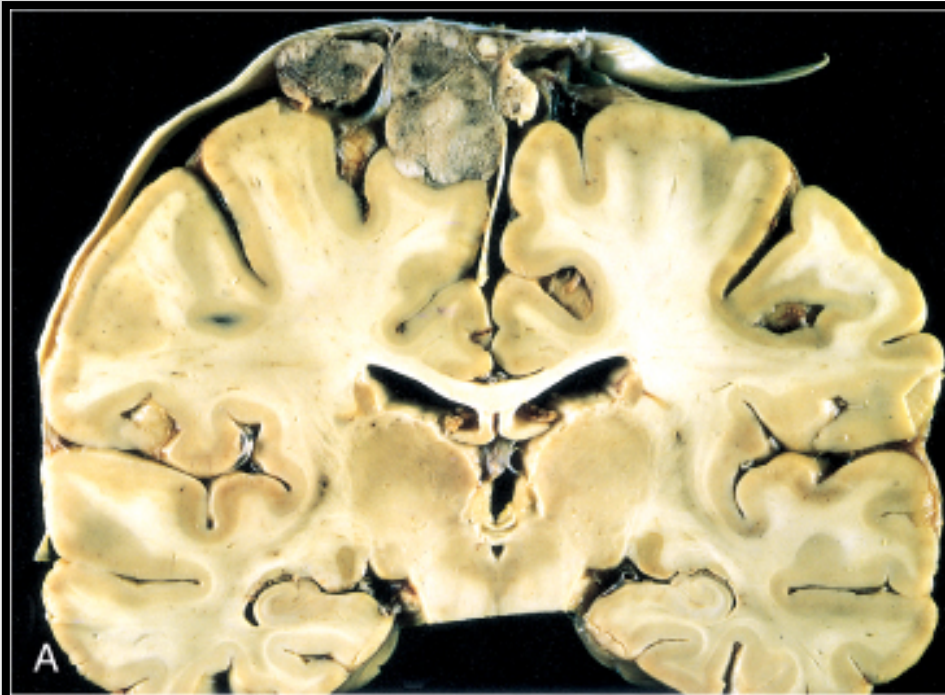
# Case 1

- A 43 years old female complains of a headache and had two attacks of seizures in the past 4 months. Brain MRI revealed a 3 cm extra-axial mass in the parietal region. It was dural-based with mild edema in the surrounding brain tissue.
- What is your provisional diagnosis?

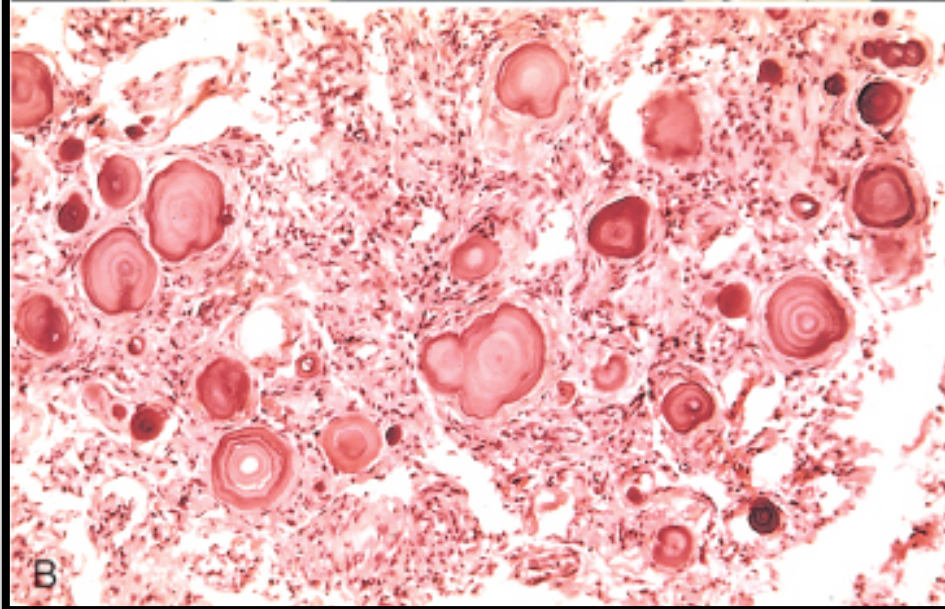
# Case 1



# Case 1



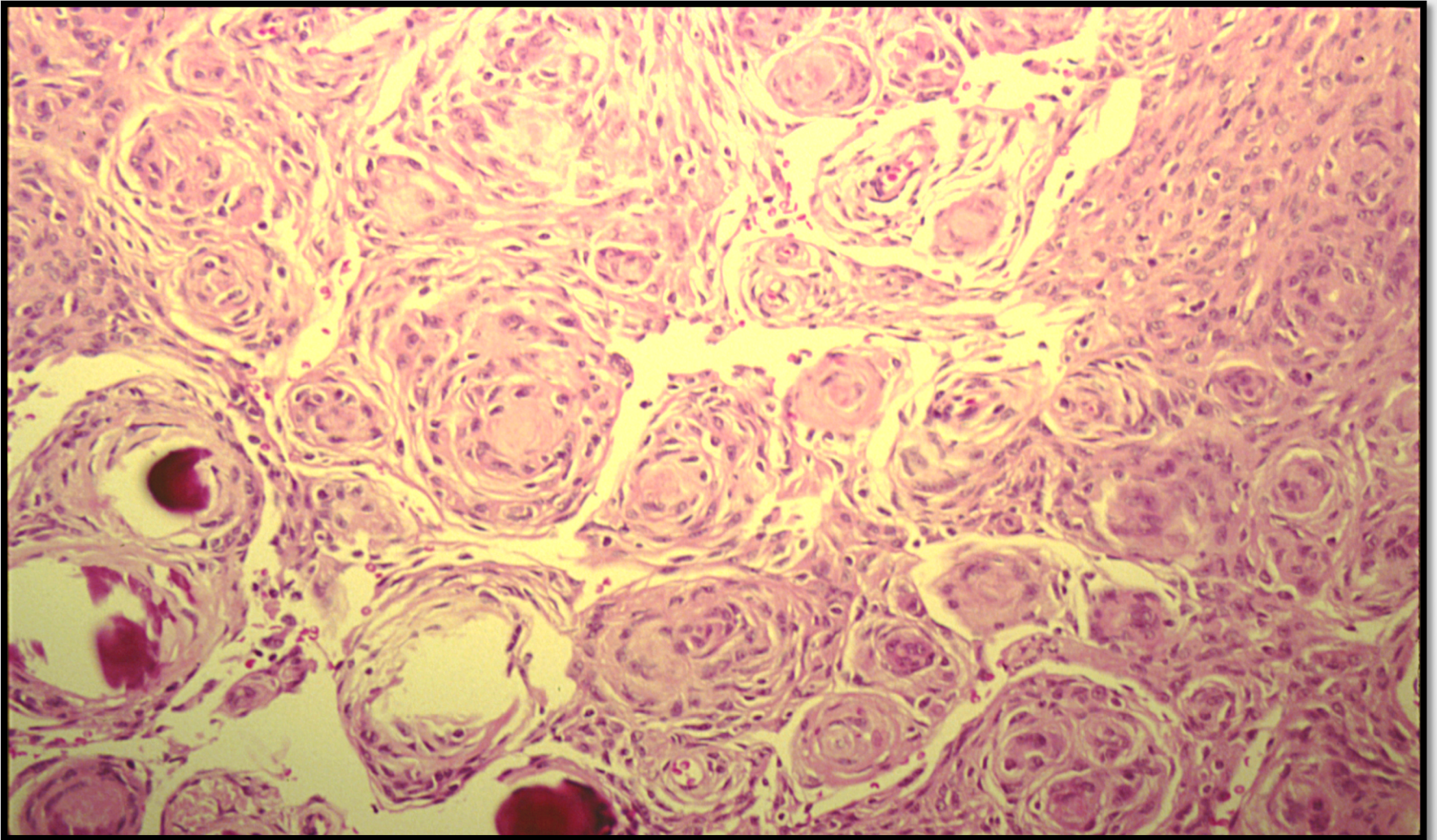
A, A parasagittal multilobular meningioma attached to the dura with compression of the underlying brain.



B, Meningioma with a whorled pattern of cell growth and psammoma bodies.



# Meningioma (Dura-brain)



# Meningioma (Dura-brain)

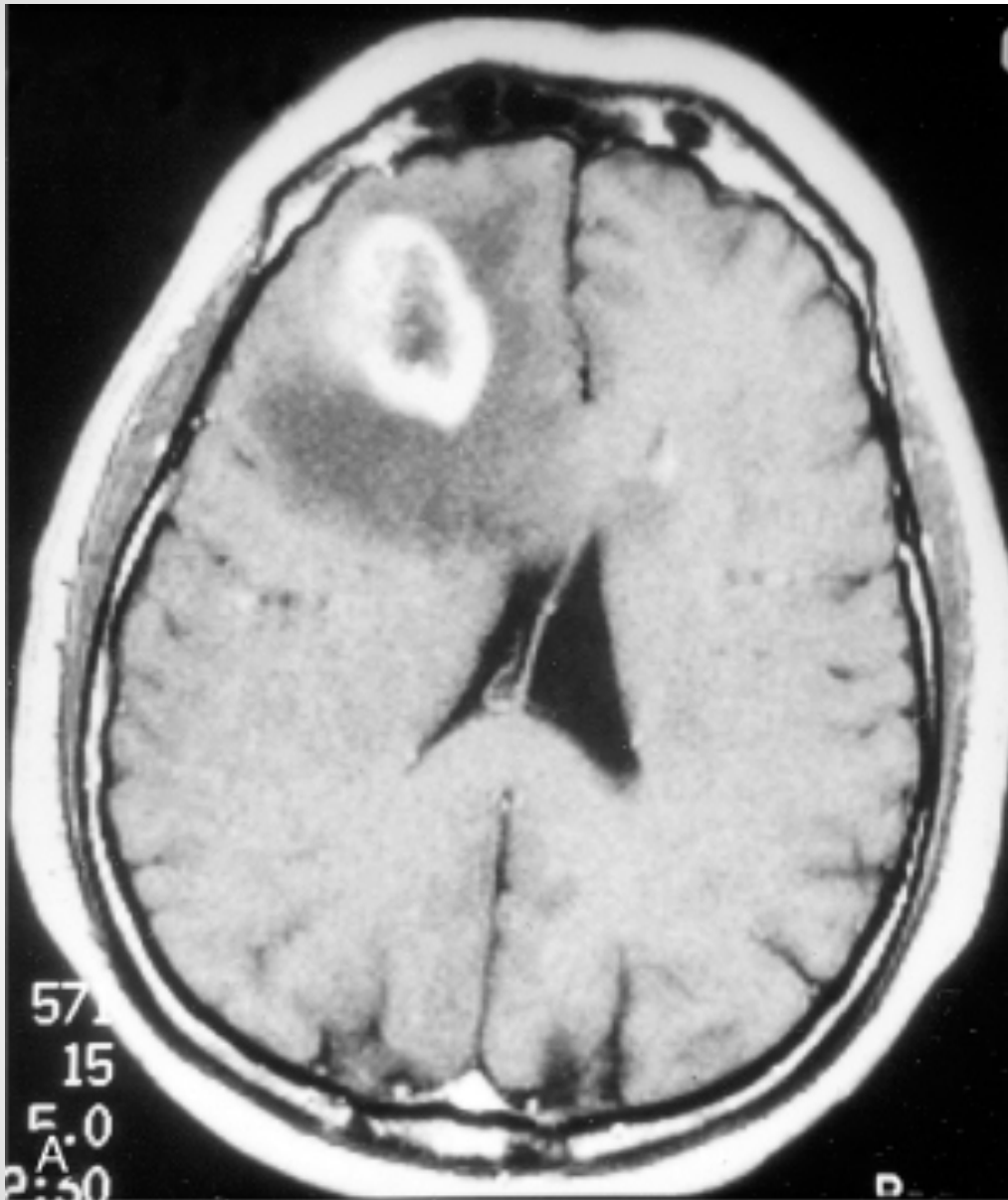
- Sections show:
  - Whorls of fibrocellular tissue.
  - Cells are oval, spindle shape or elongated and lack mitosis.
  - Psammoma bodies (spherical calcified particles).

# Case 2

# Case 2

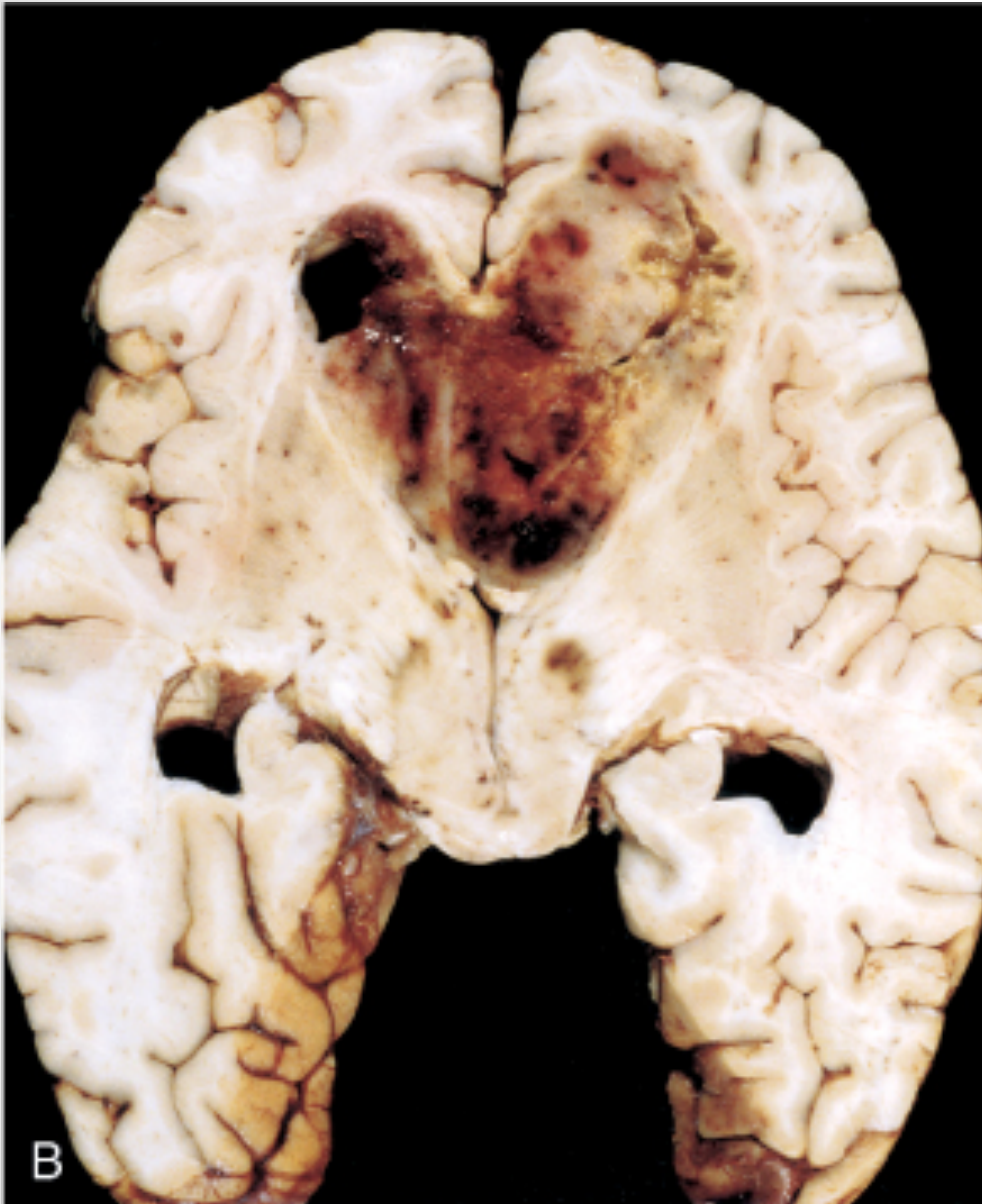
- A 55 years old man complains of a headache for the last 2 months. Brain MRI reveals a 3 cm frontal intra-parenchymal space occupying lesion with a rim enhancement on contrast studies.
- What is your provisional diagnosis ?

# Case 2



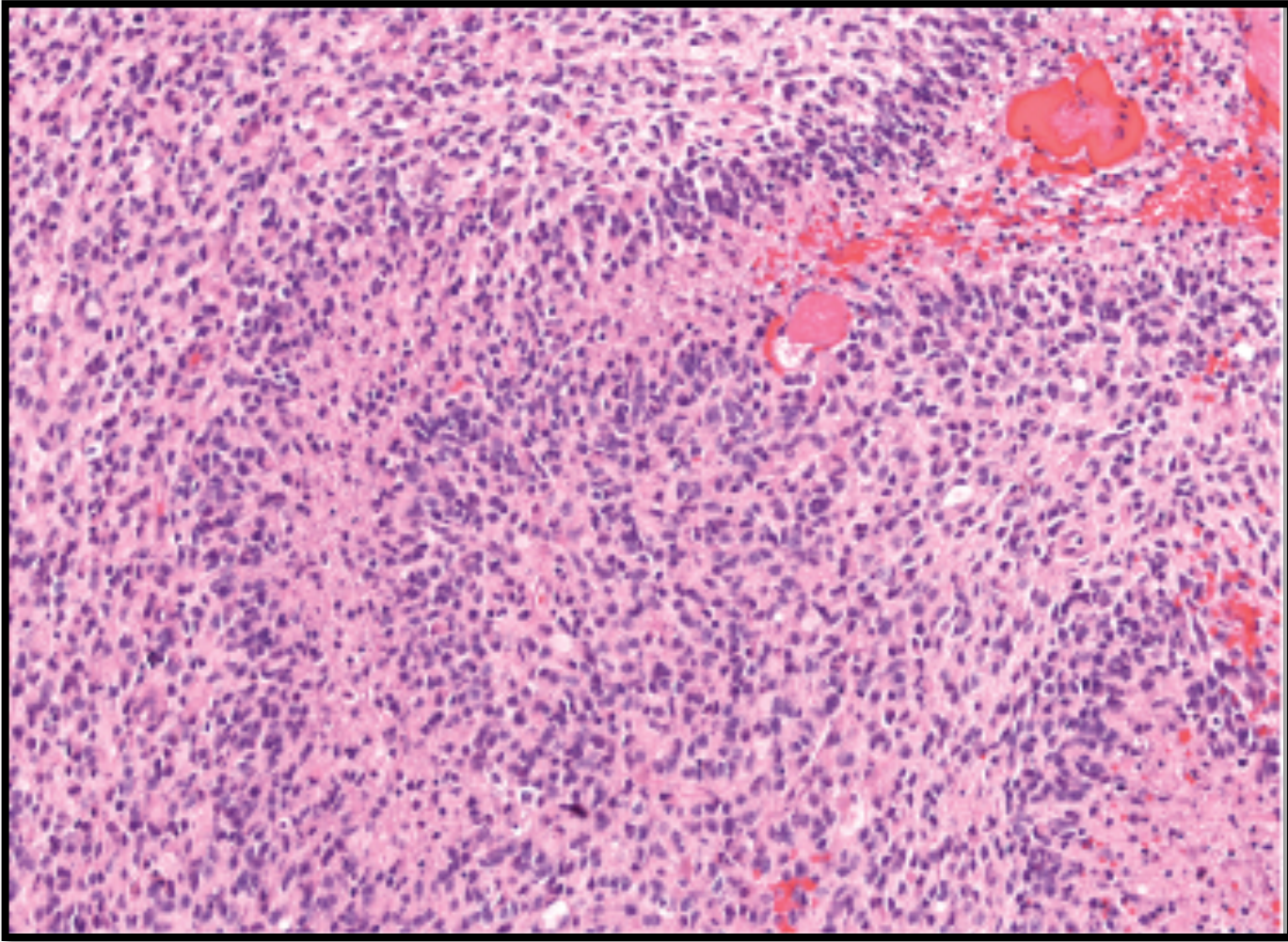
Computed tomographic scan of a large tumor in the cerebral hemisphere showing signal enhancement with contrast material and pronounced peritumoral edema.

# Case 2



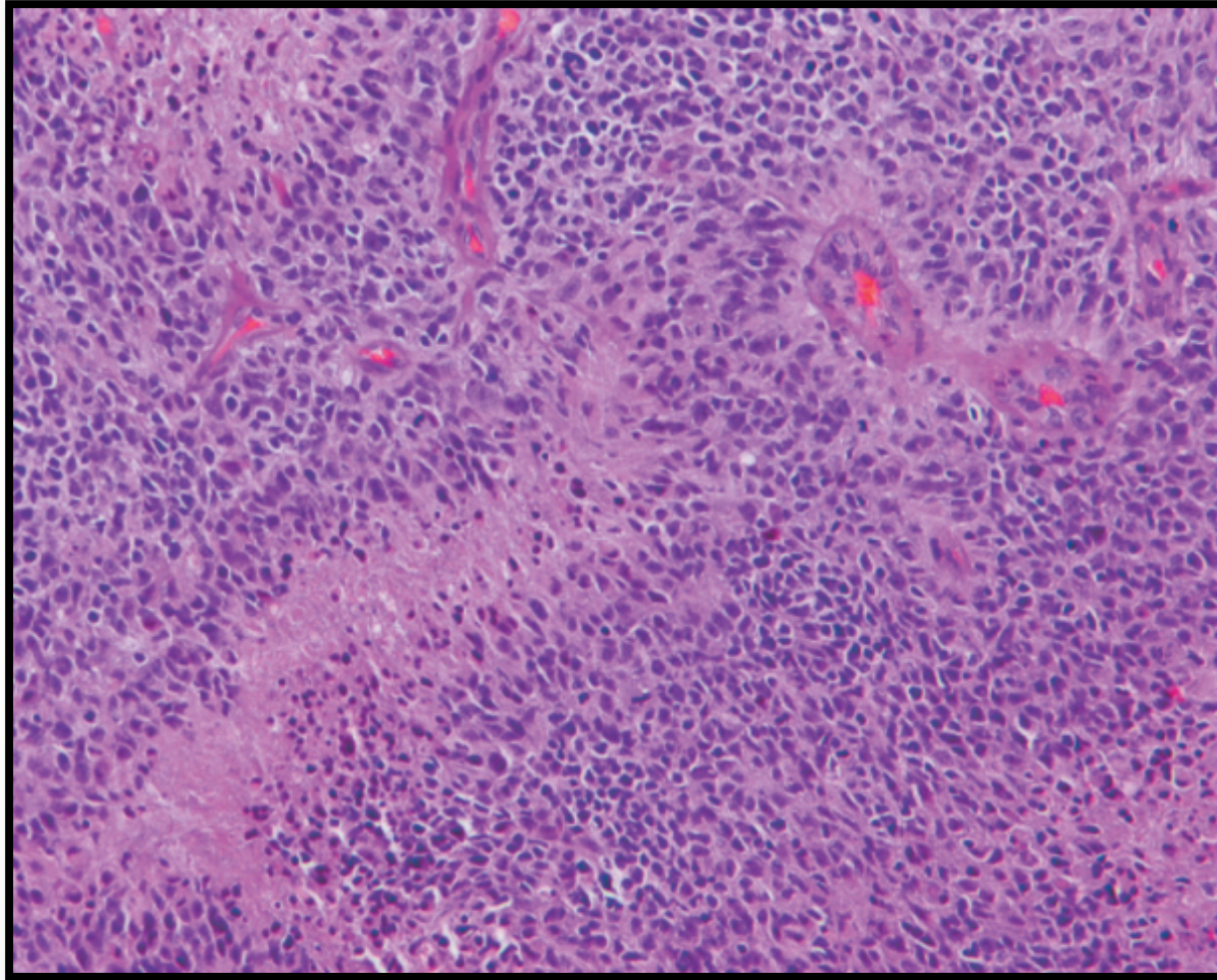
Glioblastoma multiforme appearing as a necrotic, hemorrhagic and infiltrating mass.

# Case 2



Glioblastoma: Foci of necrosis with pseudopalisading of malignant nuclei.

# Case 2



Glioblastom: Foci of necrosis with pseudopalisading of malignant nuclei and endothelial cell proliferation

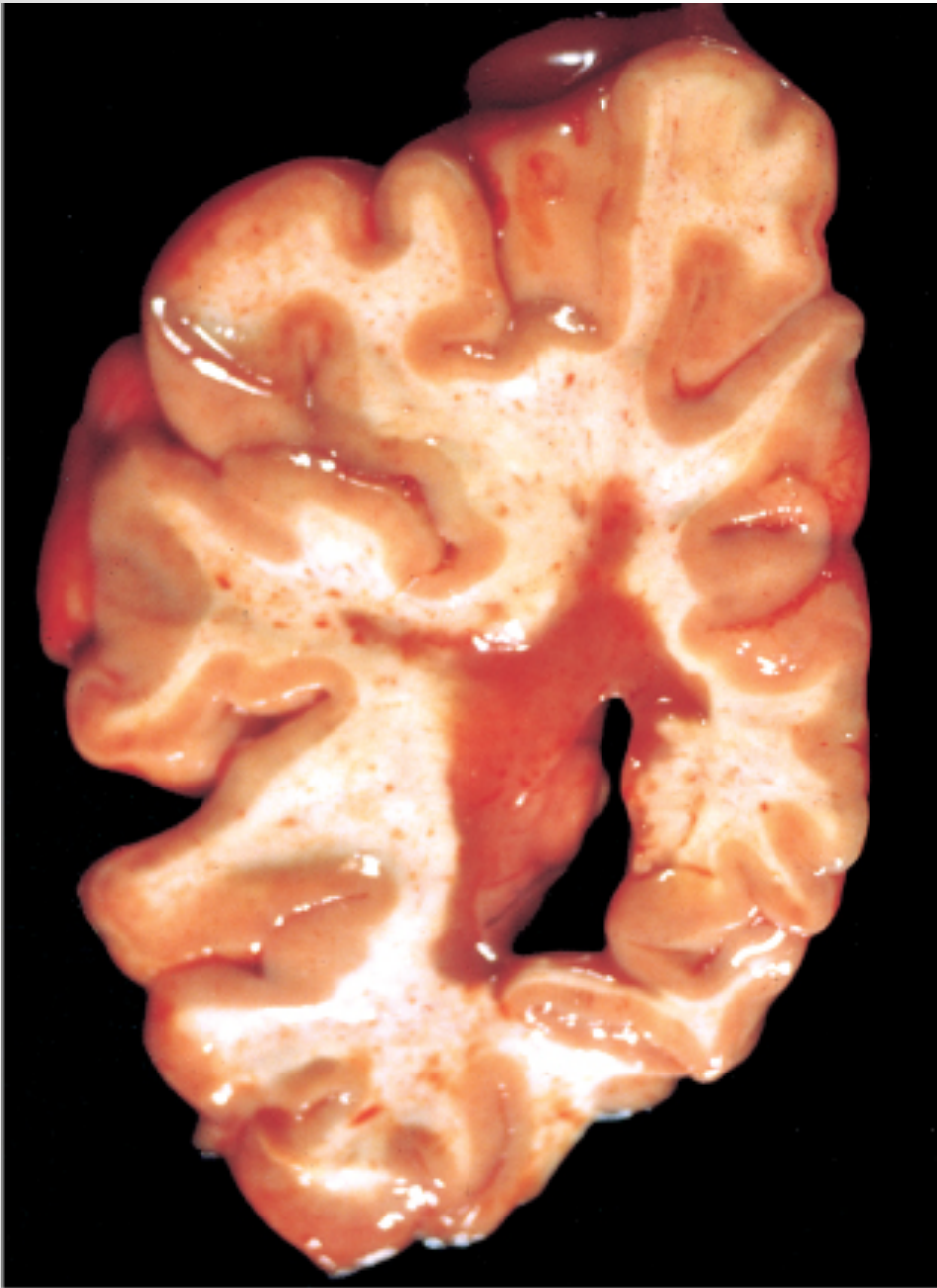


# Case 3

# Case 3

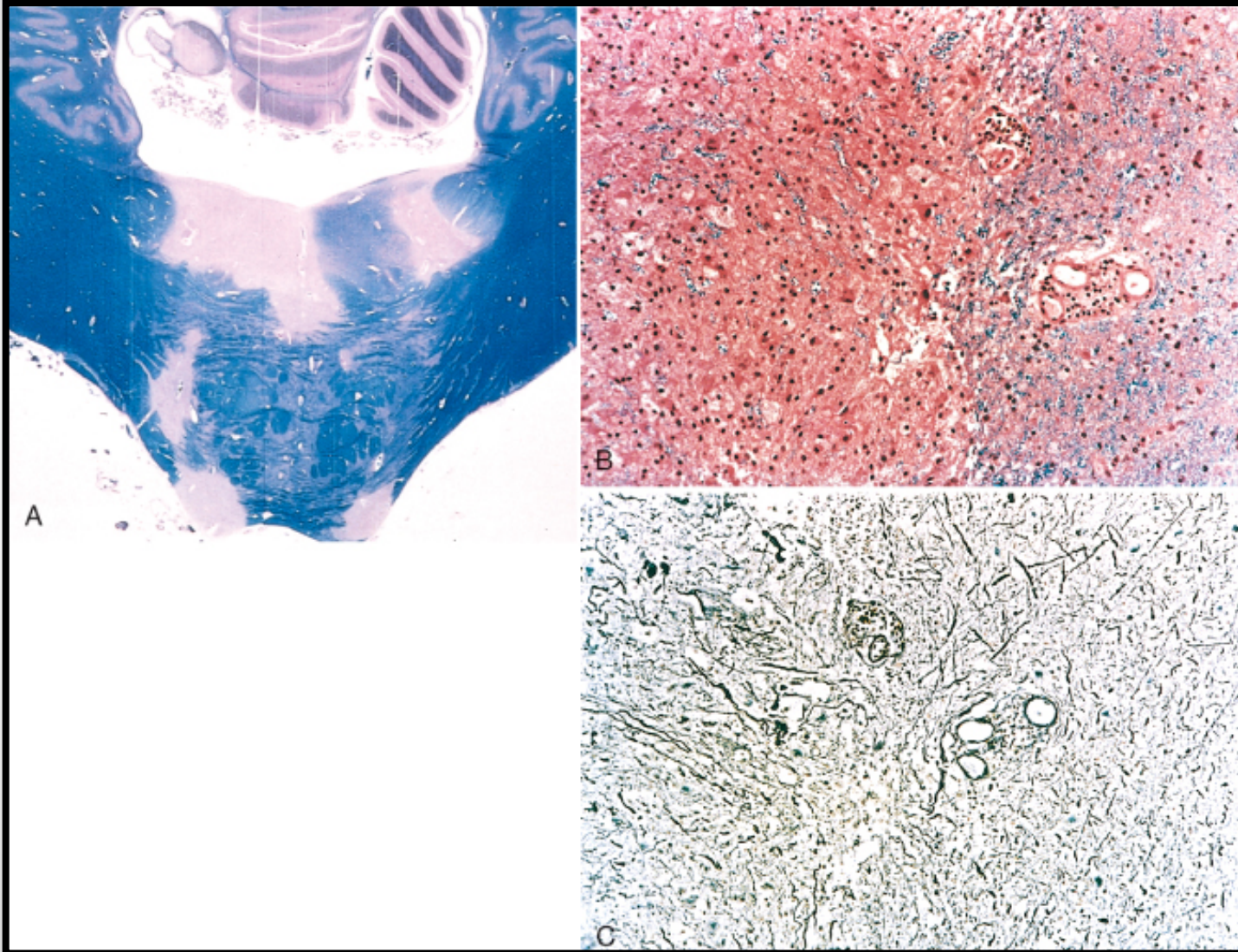
- A 27 years old woman presents with a sudden onset of right sided blindness and weakness in her left leg. There is no history of trauma. However, she experienced a similar episode 8 months ago and was diagnosed as aseptic meningitis.

# Case 3



Multiple sclerosis. Section of fresh brain showing brown plaque around occipital horn of the lateral ventricle.

# Case 3



Multiple sclerosis.

A, Unstained regions of demyelination (MS plaques) around the fourth ventricle (Luxol fast blue PAS stain for myelin).

B, Myelin-stained section shows the sharp edge of a demyelinated plaque and perivascular lymphocytic cuffs.

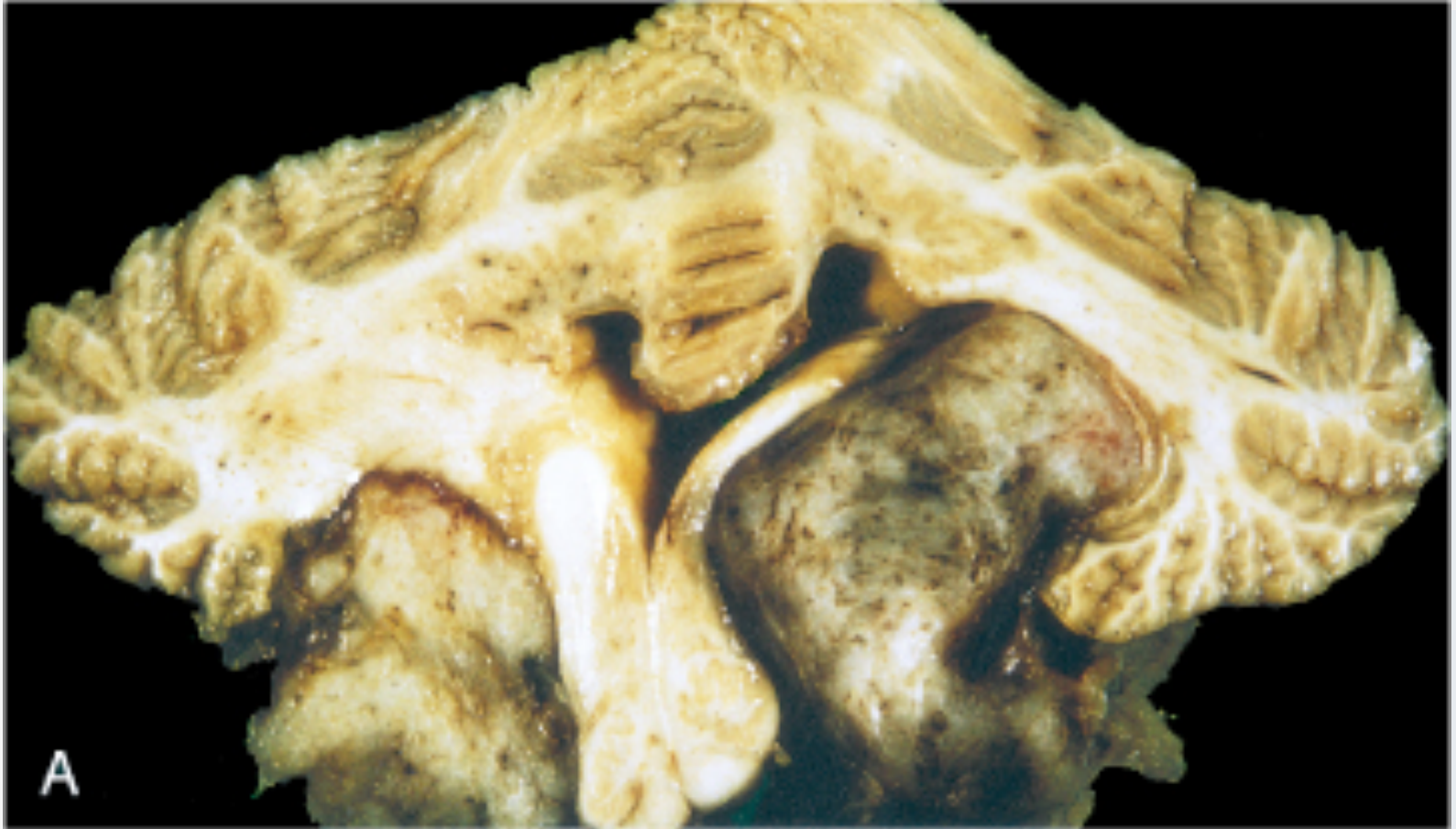
C, The same lesion stained for axons shows relative preservation.

# Case 4

# Case 4

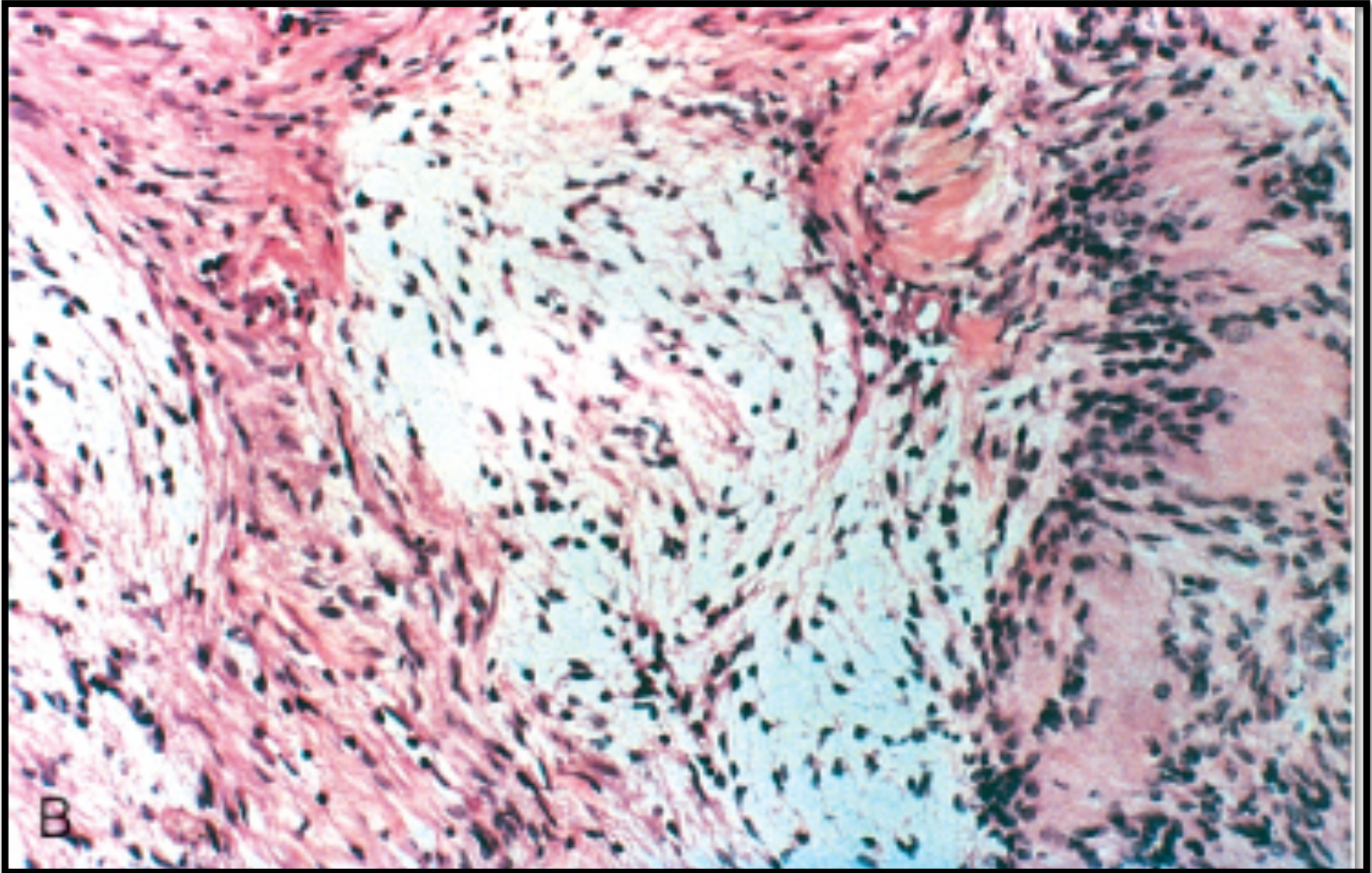
- A 39 years old man complains of a progressive hearing loss over a 2-year period. Except for occasional headaches, he has no other complaints . Evaluation discloses severe sensorineural hearing loss on the left side. MRI shows a 1.5 cm mass at the left cerebellopontine angle.
- What is your provisional diagnosis ?

# Case 4



Bilateral eighth nerve schwannomas. These are usually seen in neurofibromatosis type 2 syndrome

# Case 4



Schwannoma: Tumor showing cellular areas, including Verocay bodies (far right), as well as looser myxoid regions.



# End of Session 1

Thank You

# Case 5

# Case 5

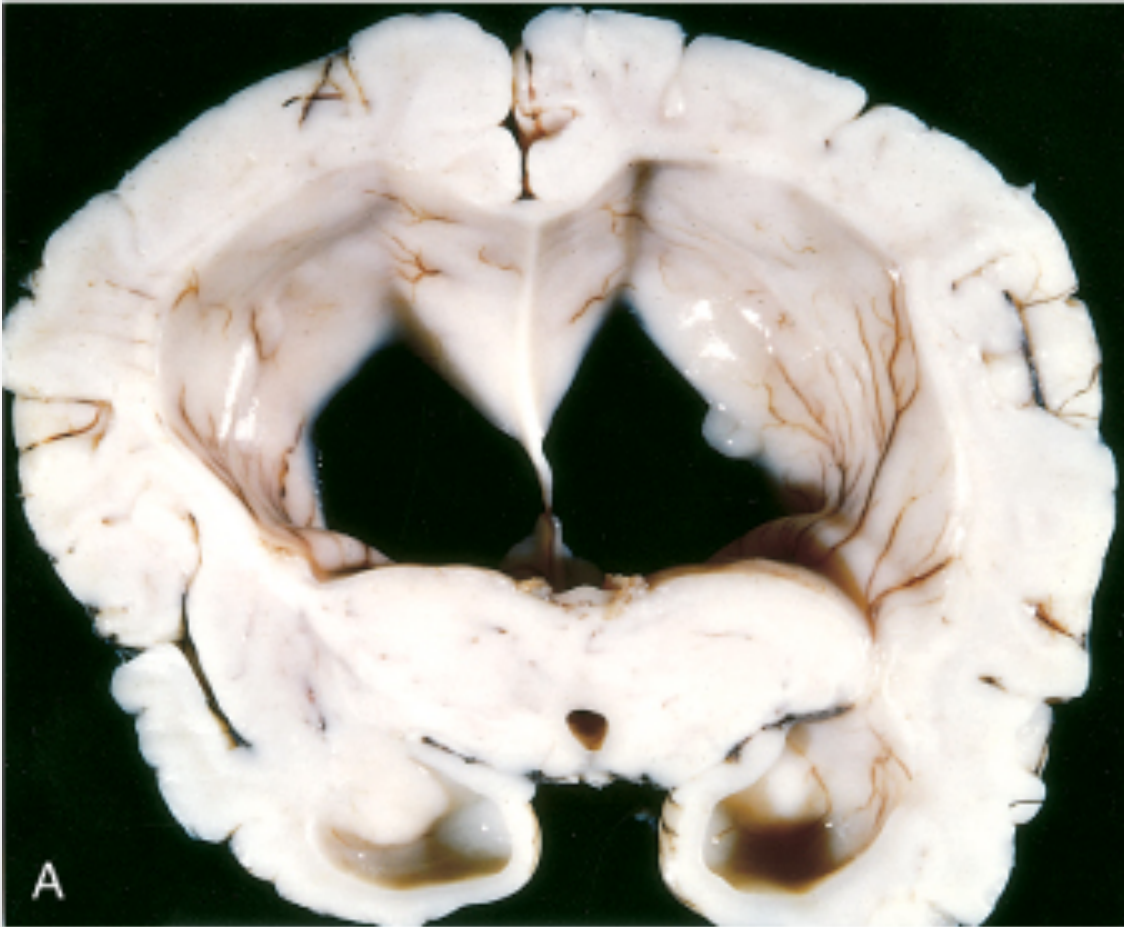
- A 9 months infant was suffering from an enlarged head size and was admitted to the hospital with convulsions. He went into a coma and died. Autopsy was done and the brain was large with dilated ventricles.
- What is your provisional diagnosis?

# Case 5



Midsagittal magnetic resonance image of a child with communicating hydrocephalus, involving all ventricles.

# Case 5



Hydrocephalus. Dilated lateral ventricles seen in a coronal section through the midline.

# Case 6

# Case 6

- A 4 years old child who was treated from otitis media, suddenly complained of a headache, vomiting, fever and stiff neck. CSF was cloudy with an abnormal increase in neutrophils, increased protein and absence of sugar. Gram stain of the CSF fluid showed meningiococci.
- What is your diagnosis ?

# Meningitis



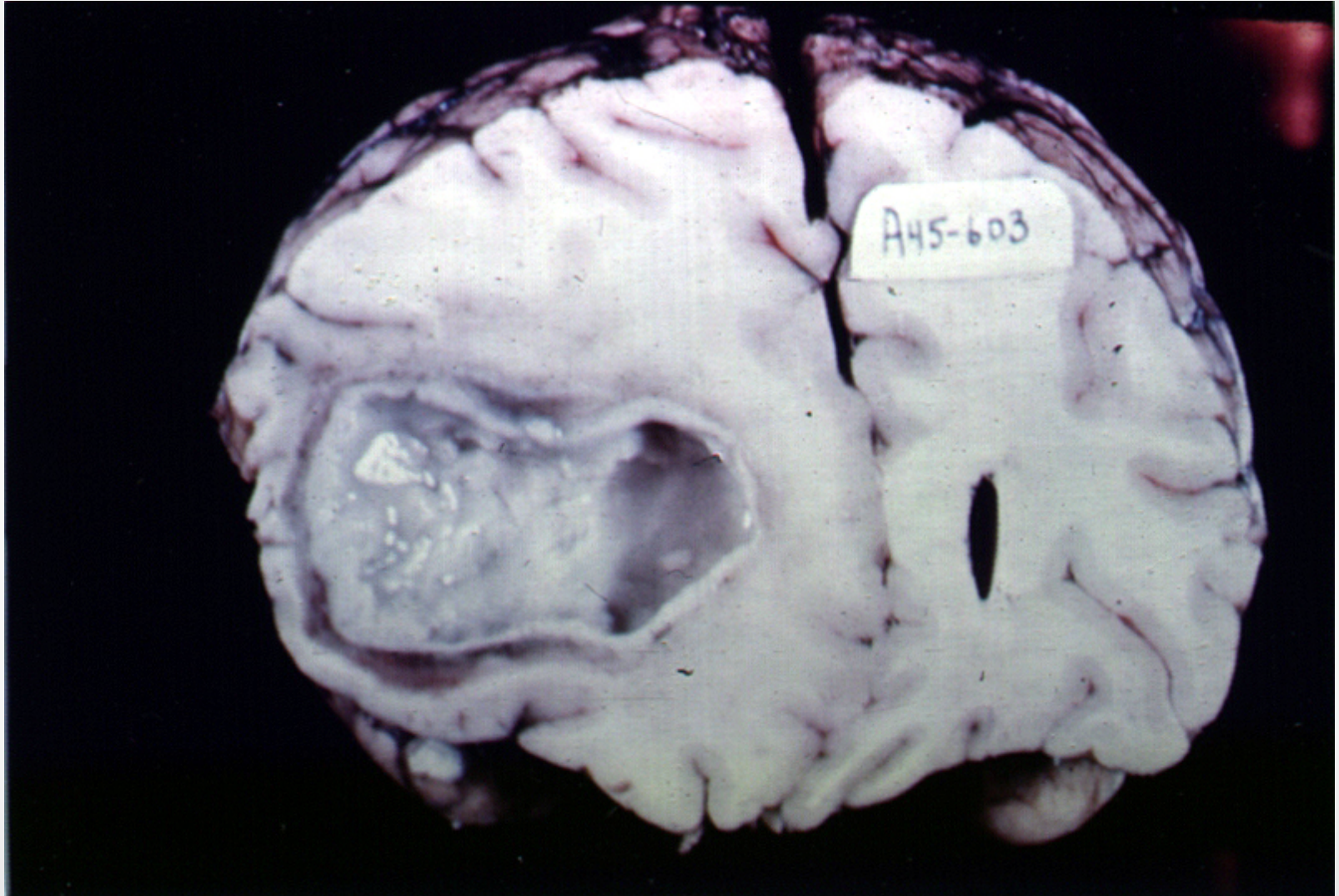


# Case 7

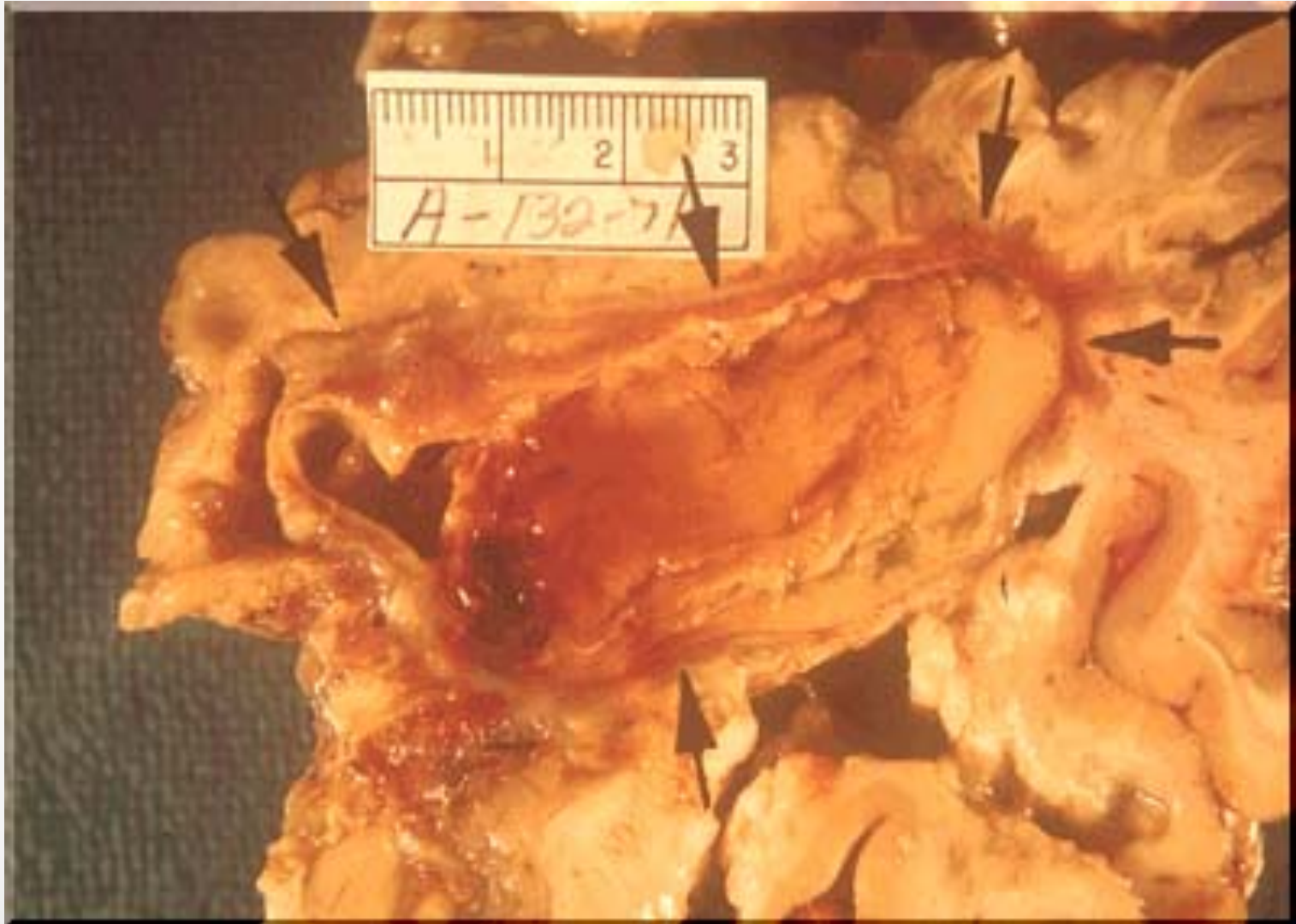
# Case 7

- A 35 years old lady complains from an otitis media. Suddenly she suffers from a headache and convulsions. Brain MRI reveals a 5 cm fluid filled cavity in the temporal lobe. Examination of the CSF shows increased pressure with lymphocytes and increased protein but there is no change of sugar content.
- What is your diagnosis ?

# Brain Abscess



# Brain Abscess

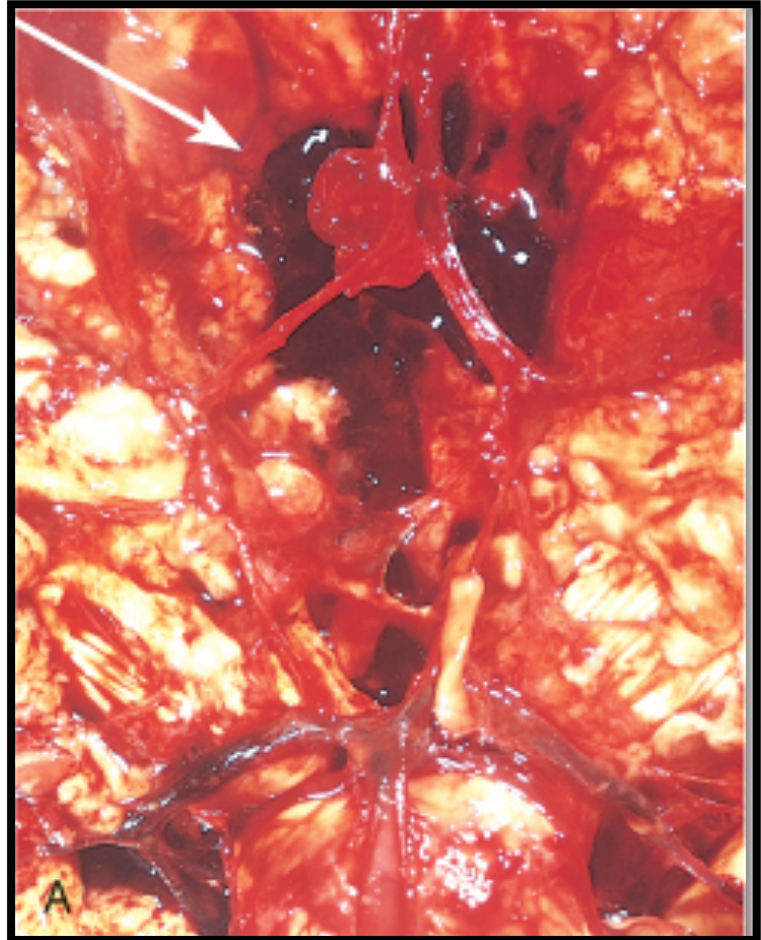


# Case 8

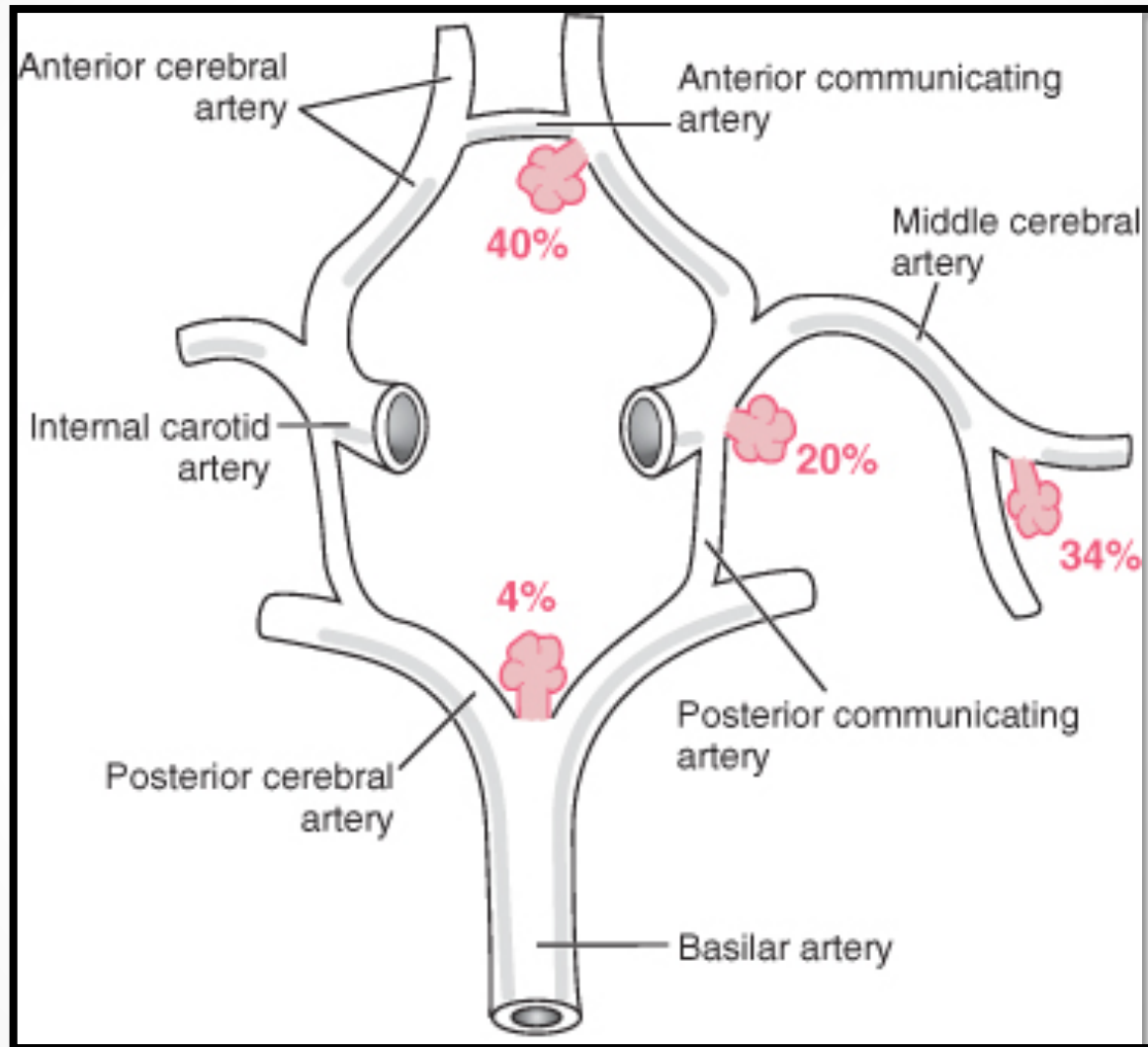
# Case 8

- A previously healthy 31-year-old woman experiences a severe headache and loses consciousness within an hour. An emergent head CT scan reveals an extensive subarachnoid hemorrhage at the base of the brain. She is afebrile. A lumbar puncture yields cerebrospinal fluid with many red blood cells, but no white blood cells. The CSF protein is slightly increased, but the glucose is normal.
- What is your provisional diagnosis ?

# Ruptured berry aneurysm causing subarachnoid hemorrhage



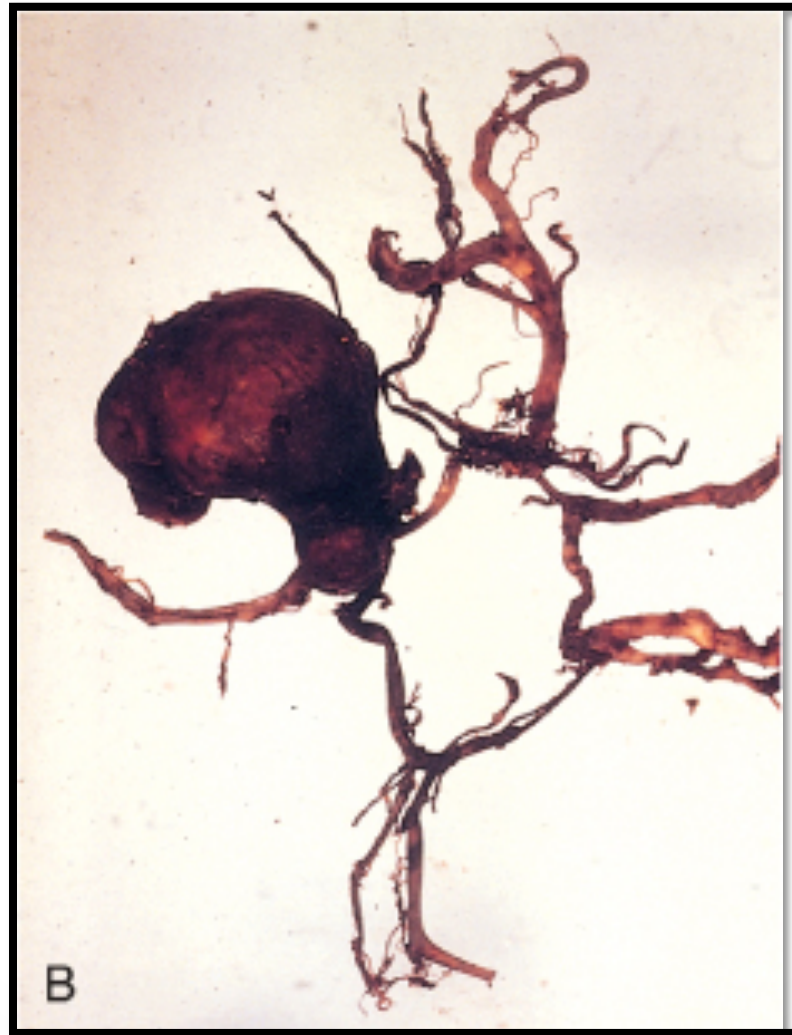
# Case 8



Common sites of saccular (berry) aneurysms in the circle of Willis

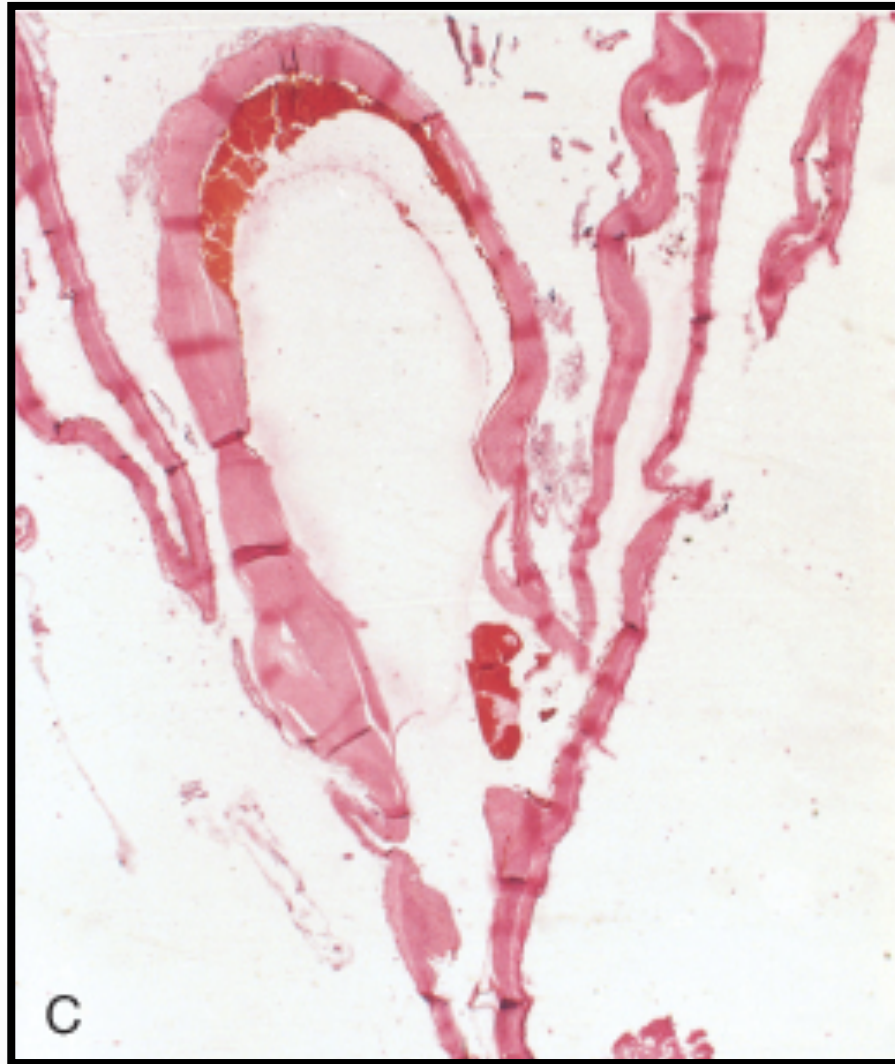


# Case 8



Dissected circle of Willis to show large aneurysm.

# Case 8



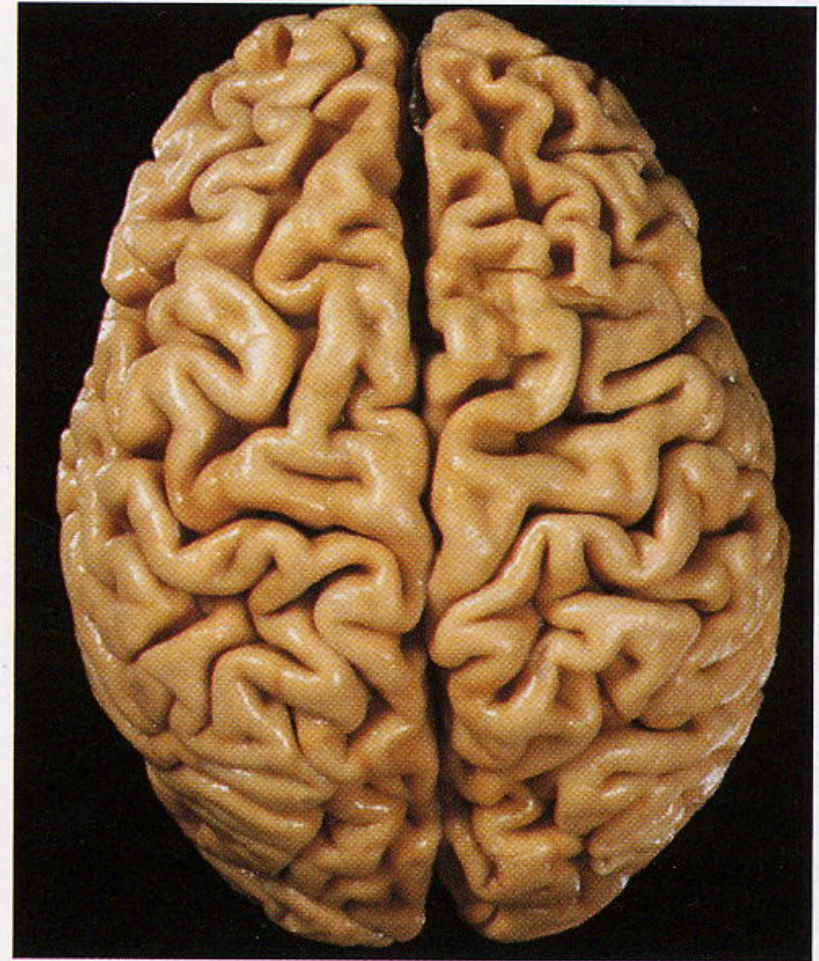
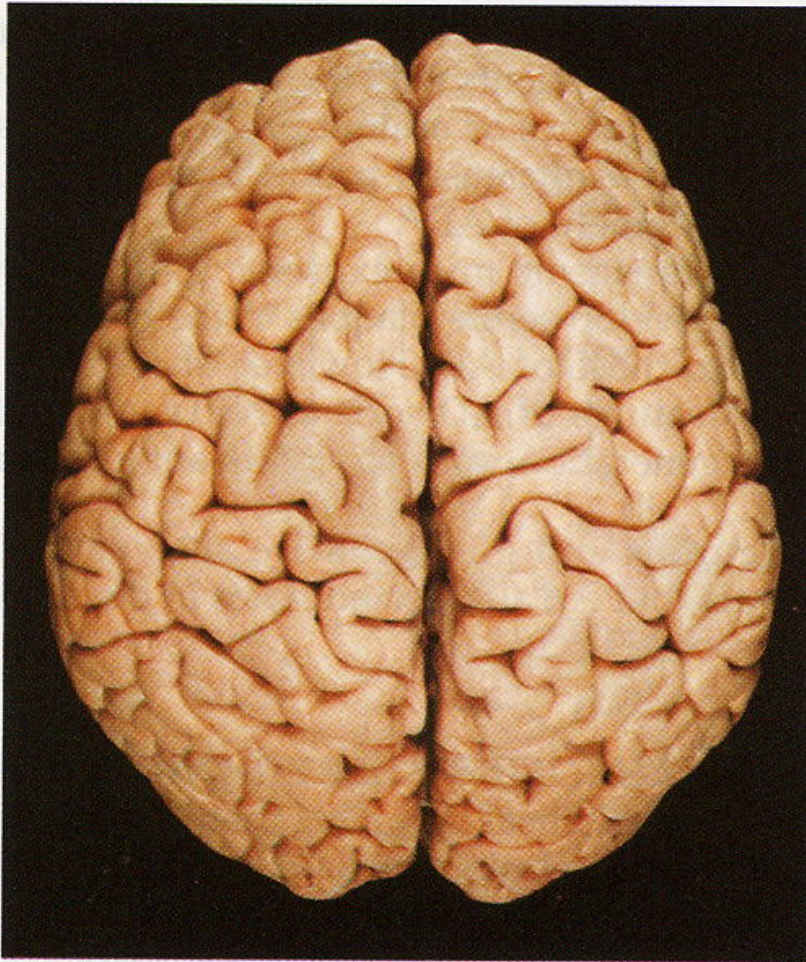
Section through a sacular aneurysm showing the hyalinized fibrous vessel wall.

# Case 9

# Case 9

- An 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.
- What is your diagnosis ?

# Case 9



A

B

FIGURE 28-123

Alzheimer disease. A. Normal brain. B. The brain of an AD patient shows cortical atrophy with thin gyri and prominent sulci.

# Case 9



Alzheimer disease with cortical atrophy most evident on the right, where meninges have been removed.

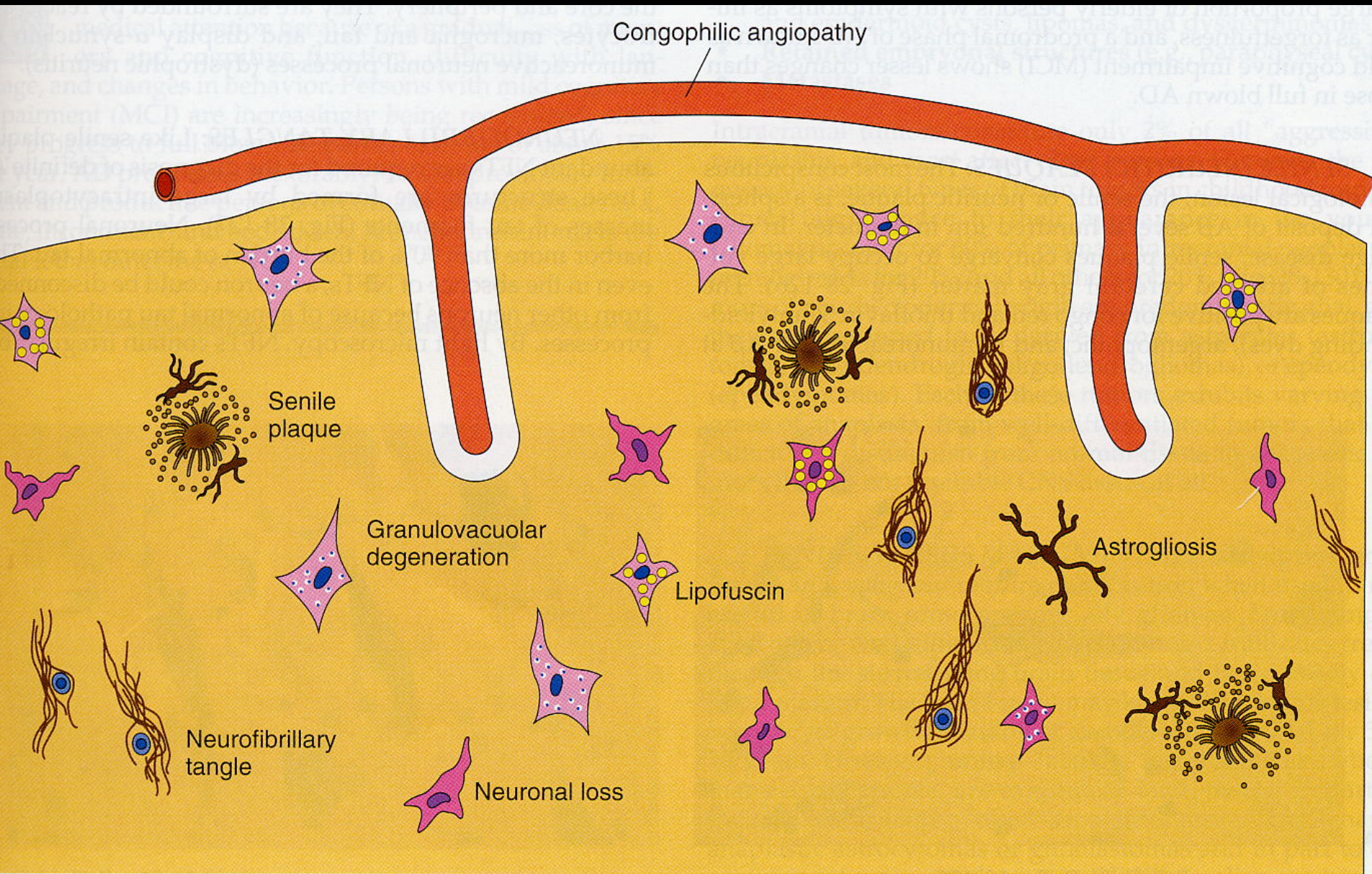
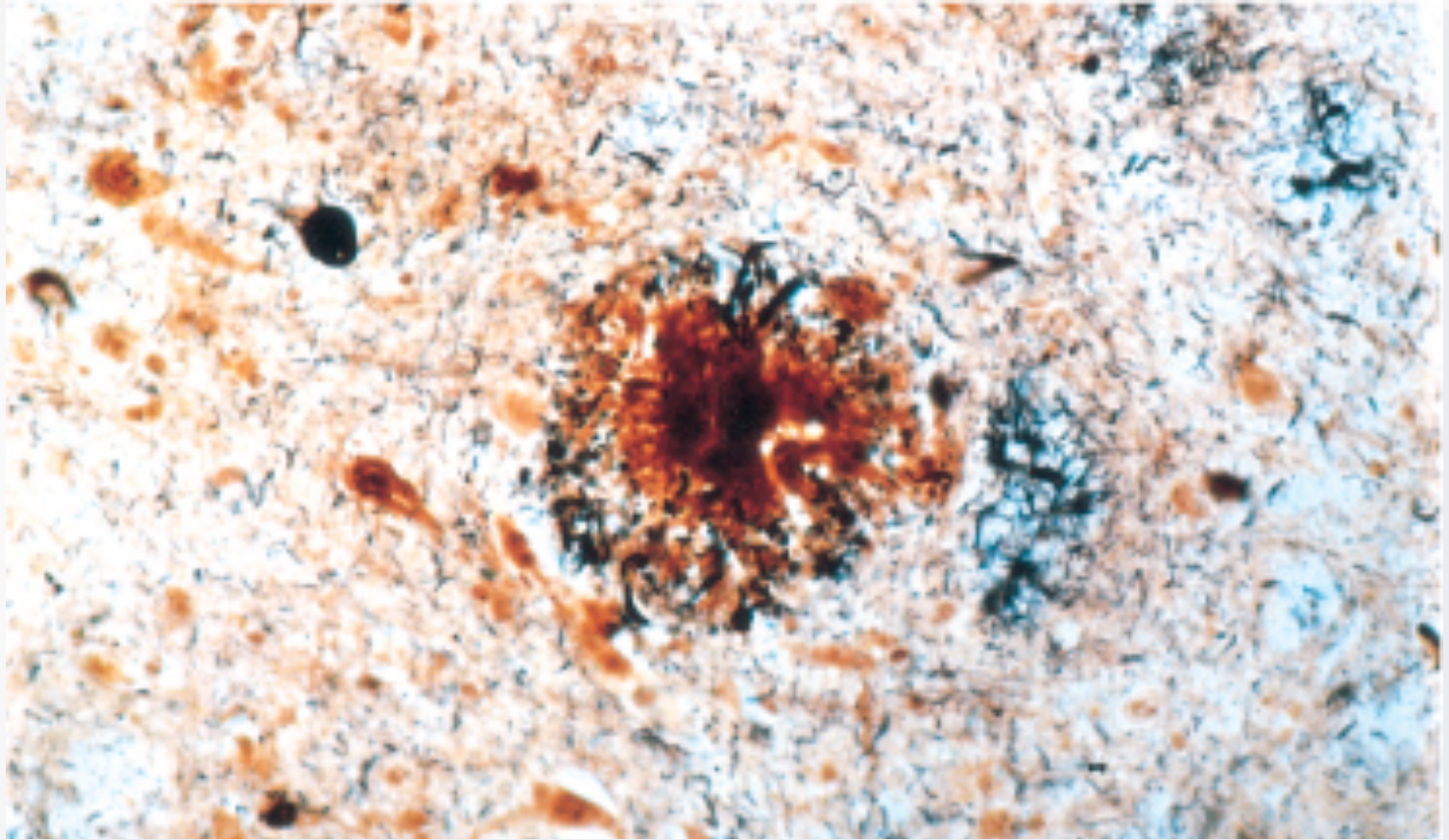


FIGURE 28-125  
Microscopic lesions of Alzheimer disease.

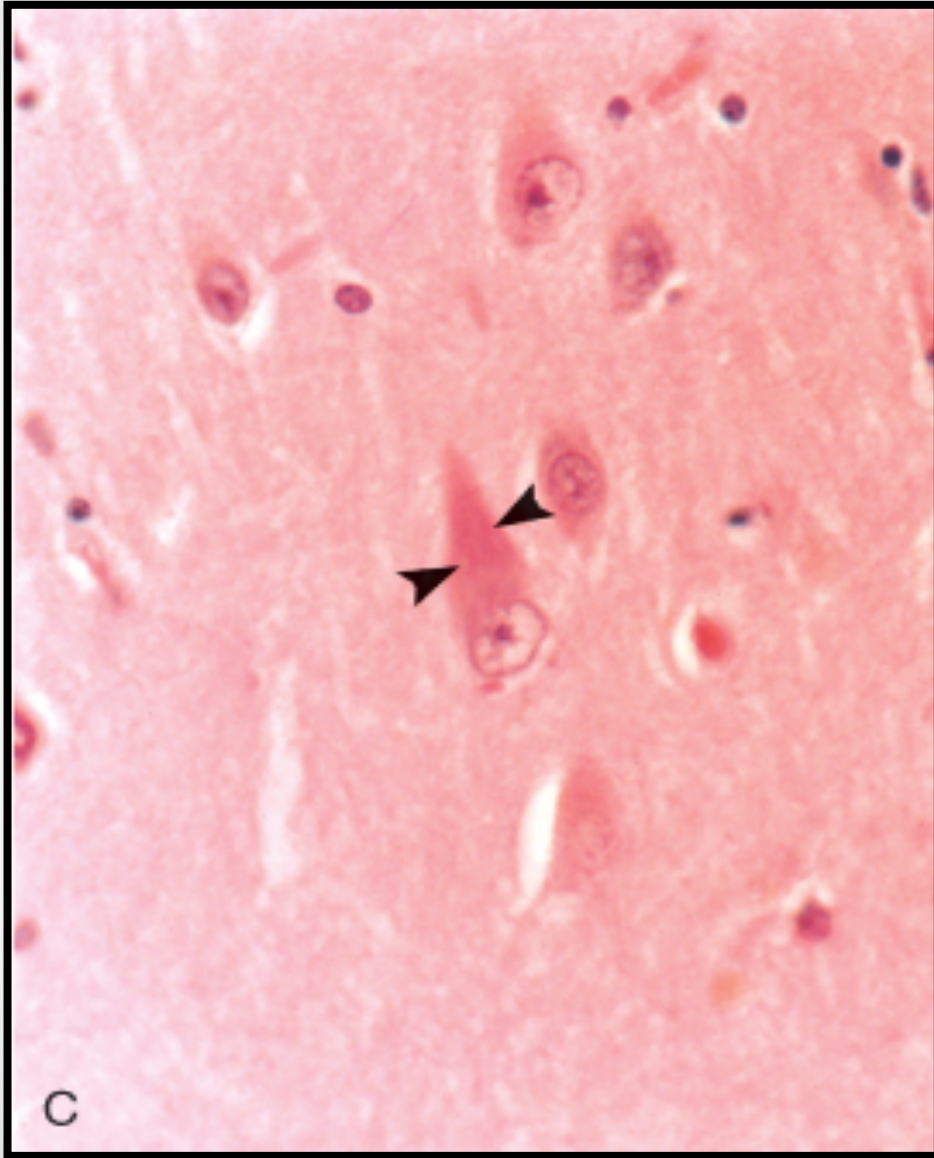
# Case 9



Alzheimer disease. A, Neuritic plaque with a rim of dystrophic neurites surrounding an amyloid core.



# Case 9



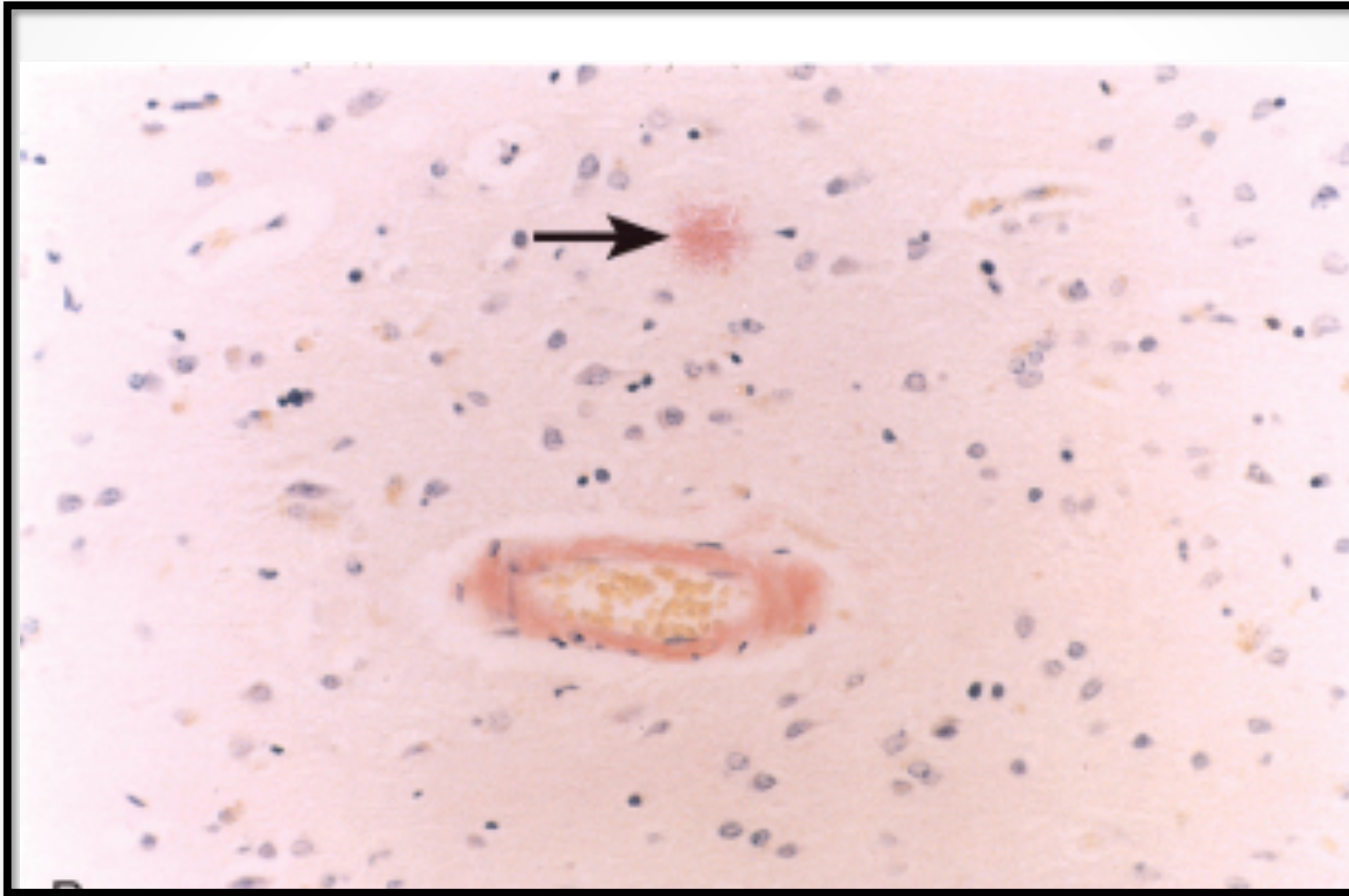
Alzheimer Disease:  
Neurofibrillary tangles  
(arrowheads) are present within  
the neurons.

# Case 9



Alzheimer Disease. D, Silver stain showing a neurofibrillary tangle within the neuronal cytoplasm.

# Case 9



Alzheimer Disease: Congo red stain of the cerebral cortex showing amyloid deposition in the blood vessels and the amyloid core of the neuritic plaque (arrow)

# Alzheimer Disease

- Macroscopic examination of the brain shows a variable degree of cortical atrophy with widening of the cerebral sulci that is most pronounced in the frontal, temporal, and parietal lobes.
- Microscopic examination: neuritic (senile) plaques, neurofibrillary tangles, and amyloid angiopathy.