

Central nervous system

## IV – Cerebrovascular diseases

- Types – Ischaemia,  
Haemorrhage
- Produce stroke syndrome

# Ischaemic brain damage

- Brain requires  $O_2$  & glucose to maintain metabolism
- 3-4 mts. cessation of blood supply will produce permanent damage
- Generalised hypo perfusion will lead to ischaemic encephalopathy
- Eg: cardiac arrest and CO poisoning

# Ischaemic (Hypoxic) encephalopathy

- clinically coma, vegetative life
- Pathology – pseudolaminar necrosis, watershed infarcts

# Cerebral Infarction

- Focal cerebral ischemia
- Sustained ischemia followed by infarction in the territory of the compromised vessel
- type of infarct and extent of tissue damage influenced by duration of ischemia and adequacy of collateral flow

# Causes of cerebral infarction

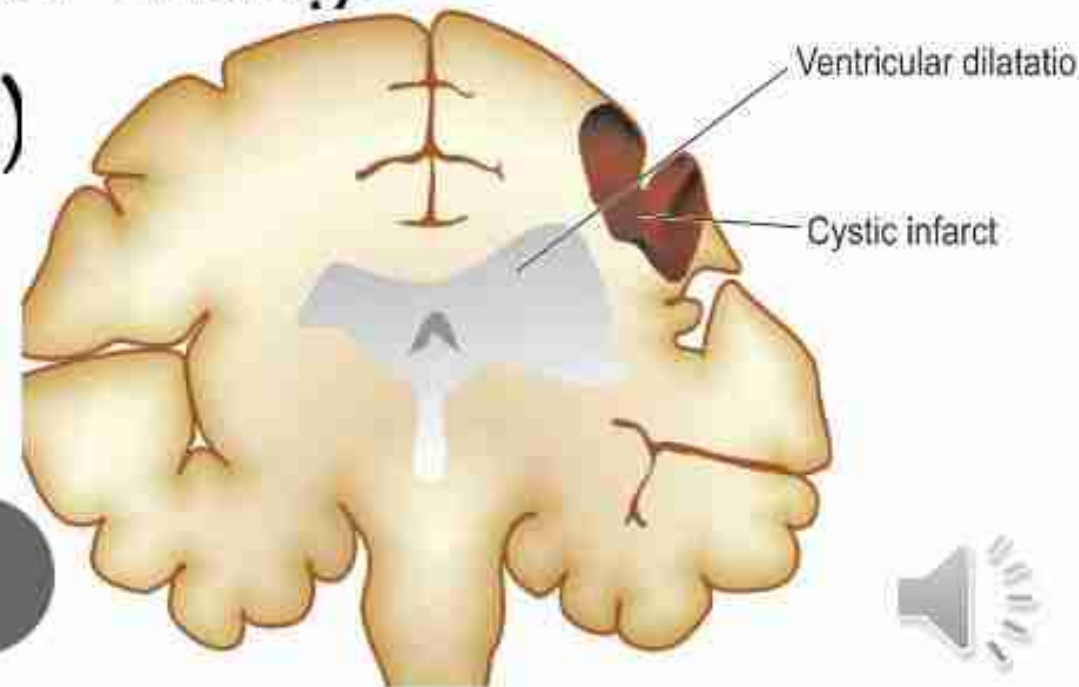
Occlusive vascular disease caused by

- Embolus to the brain
- In situ thrombosis
- Various forms of vasculitides

# Cerebral Infarction

- Pathology: non hemorrhagic/ischemic  
central liquefaction  
peripheral glial reaction
- Micro: ischemic neuronal change  
(Red neurones)

\* Old infarcts - Cystic



# Intracranial haemorrhage

- Intracerebral (HT) – basal ganglia, pons, cerebellum
- Subarachnoid (Aneurysm)– Berry, mycotic, fusiform
- Mixed – vascular malformations, bleeding diathesis

# Berry aneurysms

- Saccular in appearance
- Rounded or lobulated bulge arising at the bifurcation of intracranial arteries
- 2 mm to 2 cm or more.
- Account for 95% of aneurysms
- Liable to rupture
- Rare in childhood but increase in frequency in young adults and middle life.



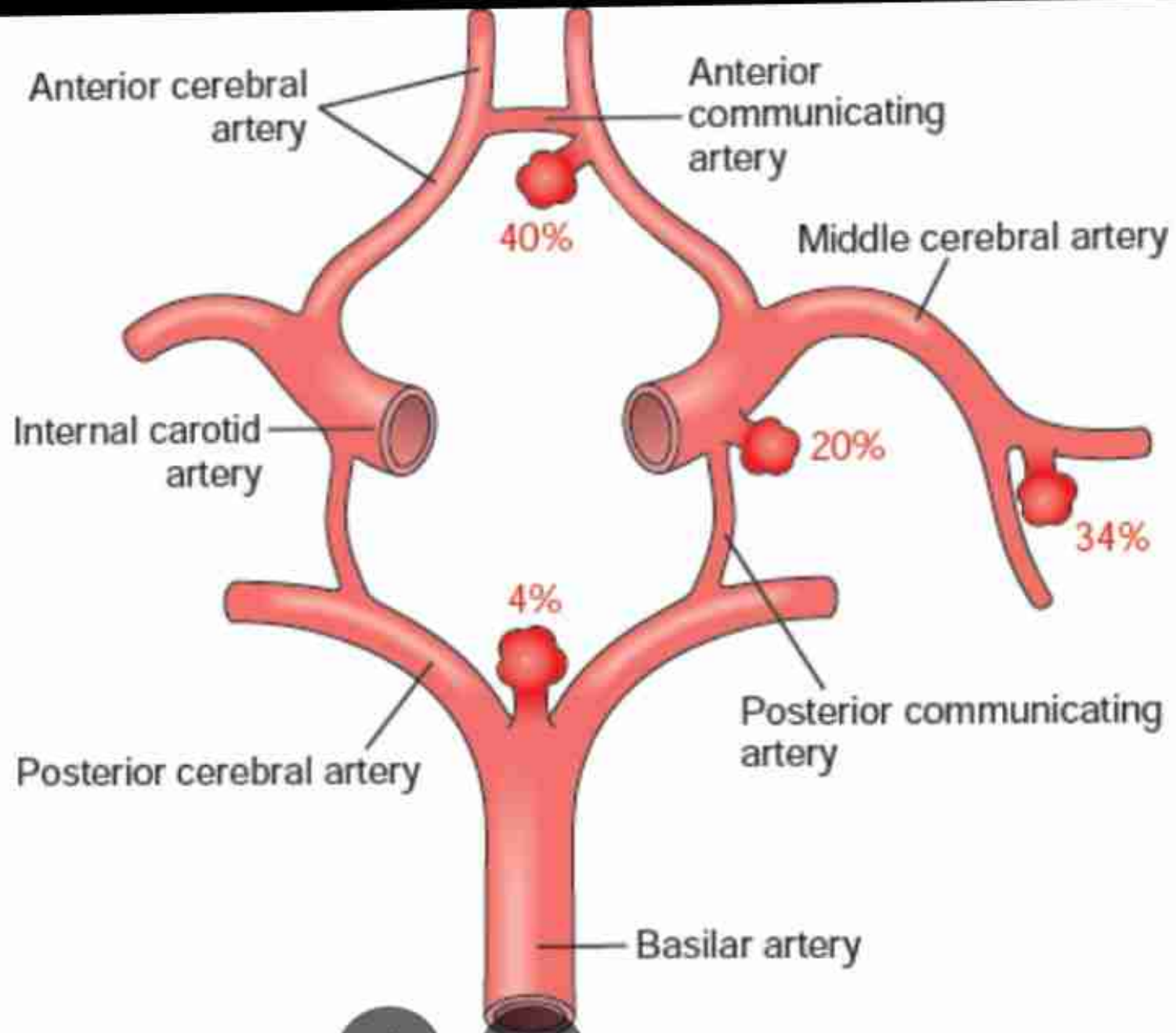


Figure 28-19 Common sites of saccular (berry) aneurysms in the circle of Willis.

# Degenerative Diseases

## Alzheimer's Disease

- Dementia in elderly
- A $\beta$  amyloid from APP
- Gross: reduced volume of brain, bilateral atrophy
- Micro: Senile plaques, Amyloid angiopathy, Neurofibrillary tangles

# Parkinsonism

- C/c progressive disorder of motor function
- Associated with protein accumulation and aggregation, mitochondrial abnormalities, and neuronal loss in the substantia nigra and elsewhere in the brain.
- Micro:
  - Loss of neuromelanin from neurones
  - Depigmentation of Substantia nigra
  - Lewy bodies

# Tumours of Central Nervous System

One fourth metastatic

Children - Primary CNS tumours - second  
commonest neoplasm

Most common - Leukaemias

# Classification of CNS tumours

I- Diffuse astrocytic & oligodendroglial tumors

Astrocytoma

Oligodendroglioma

II - Other astrocytic tumors

III - Ependymal tumors

IV - Other gliomas

V - Choroid plexus tumors

- VI – Neuronal and mixed neuronal glial tumors
- VII – Tumors of the pineal region
- VIII – Embryonal tumors
- IX – Tumors of the cranial and paraspinal nerves
- X – Meningiomas
- XI – Mesenchymal non-meningothelial tumors
- XII – Melanocytic tumors
- XIII – Lymphomas
- XIV – Histiocytic tumors

- XV – Germ cell tumors
- XVI – Tumors of the sellar region
- XVII – Metastatic tumors

- **Gliomas**

Most common primary CNS tumour  
(40%)

Astrocytomas

Oligodendrogliomas

Ependymomas

# Astrocytoma

Commonest of gliomas

6<sup>th</sup> decade

Low to high grade

Children- low grade- pilocytic

Cerebral hemispheres

4 grades —Grade 1

well differentiated / grade 2

Anaplastic/grade 3

Glioblastoma /grade 4

Gross: grey white < >

# Astrocytoma

Commonest of gliomas

6<sup>th</sup> decade

Low to high grade

Children- low grade- pilocytic

Cerebral hemispheres

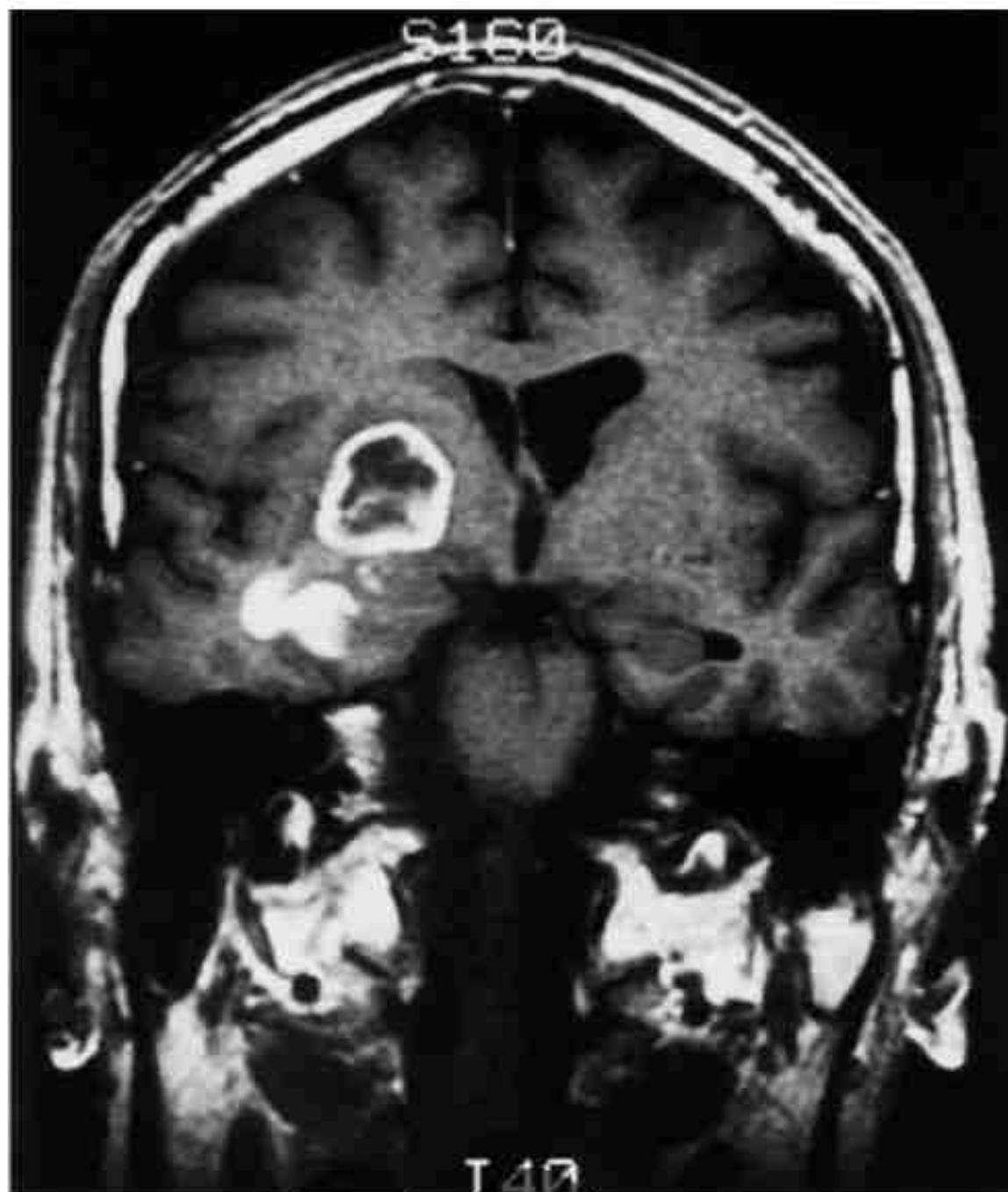
4 grades —Grade 1

well differentiated / grade 2

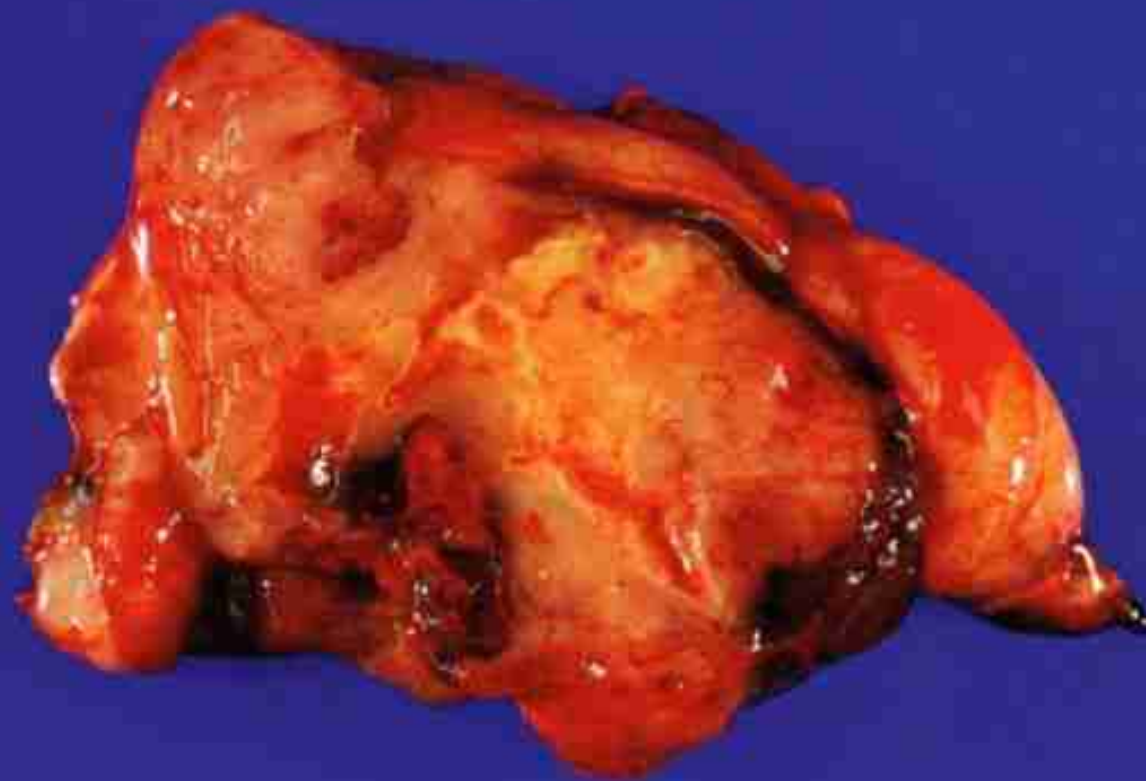
Anaplastic/grade 3

Glioblastoma / grade 4

Gross: grey white < >

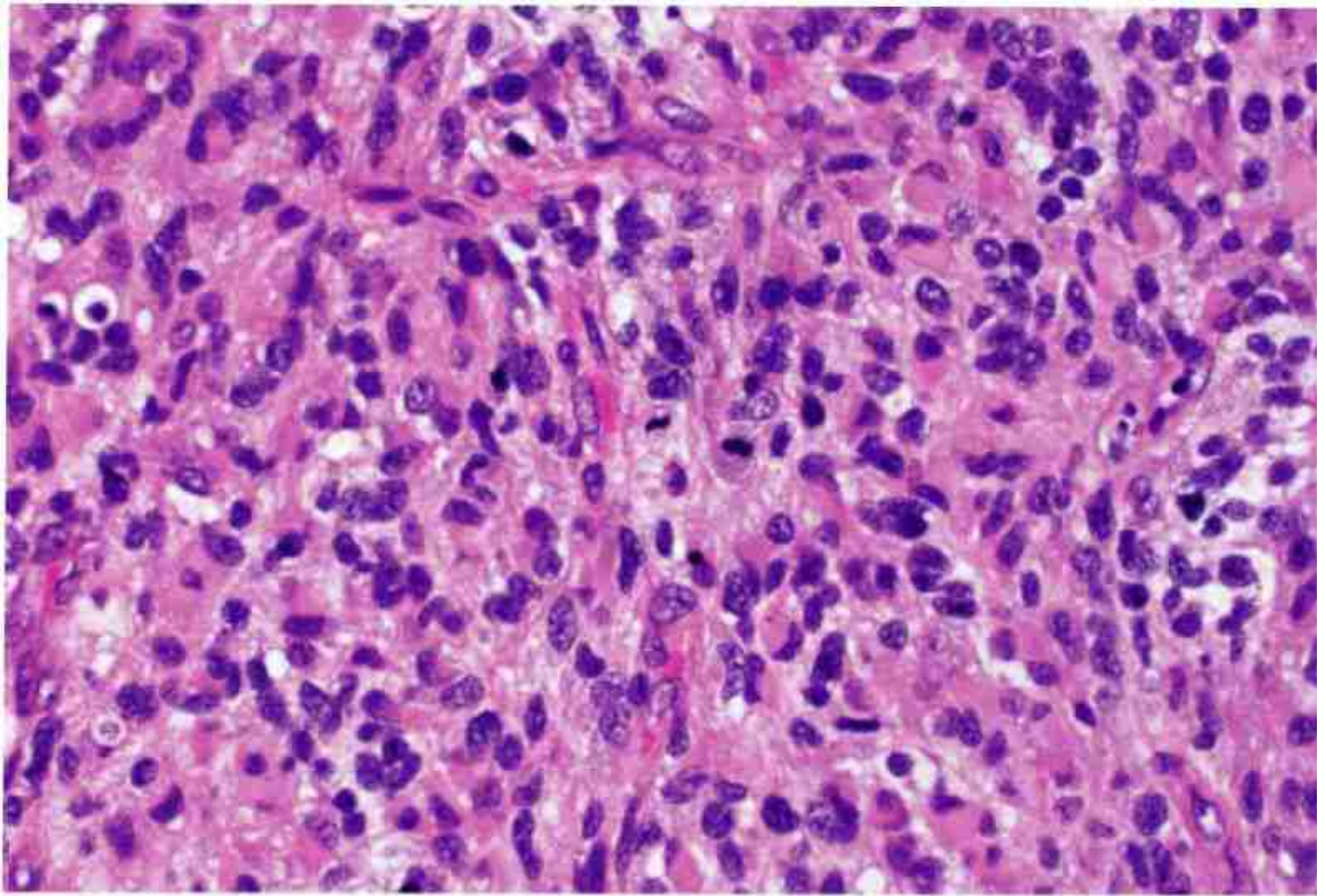


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Glioblastoma multiforme. MR studies, (enhancing)



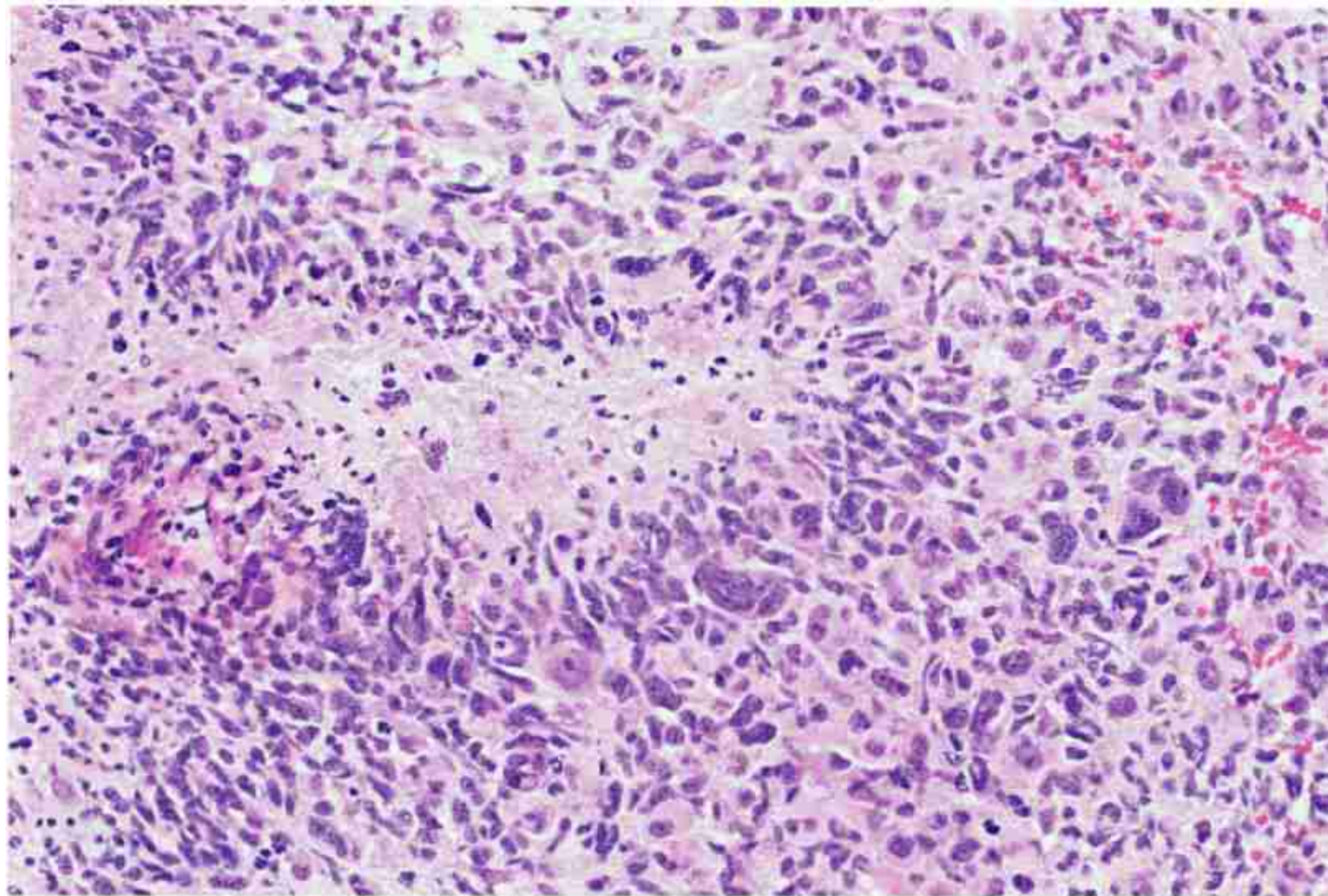
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Glioblastoma multiforme. foci of hemorrhage and necrosis



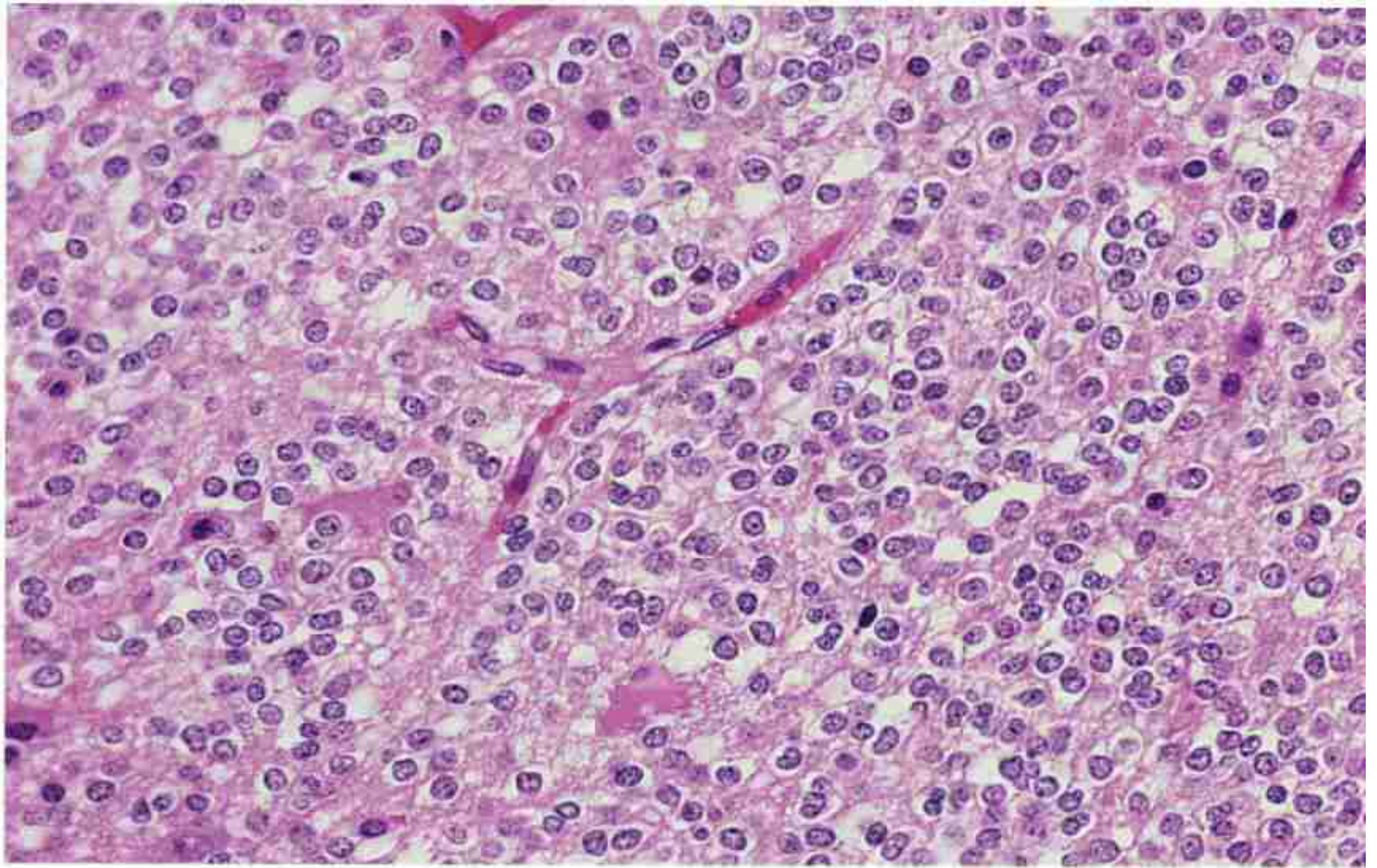
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Glinblast>mg



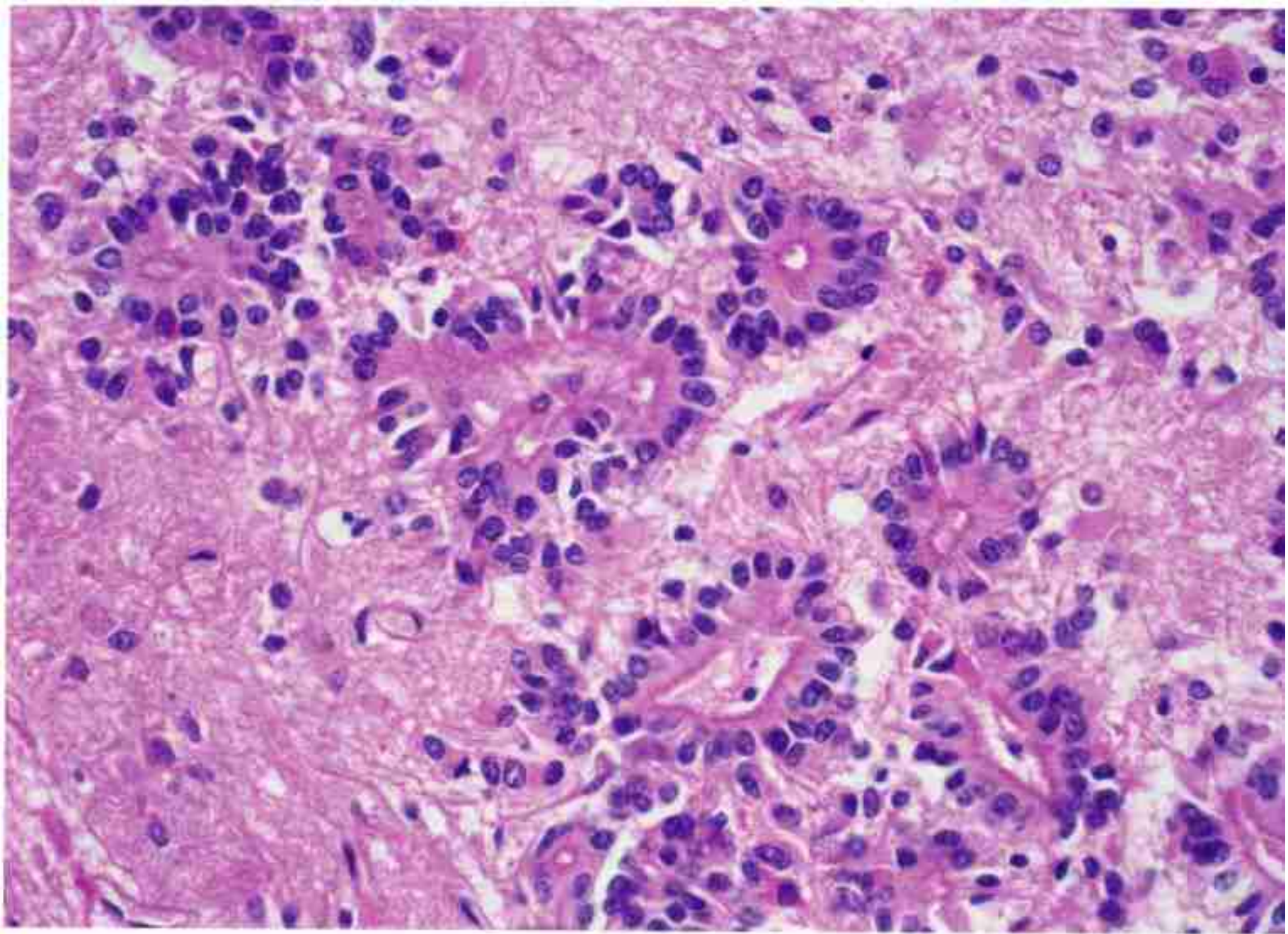
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glioblastoma multiforme. Zones of coagulative necrosis lined by "palisading"



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Oligodendroglioma. Uniform, round nuclei and clear perinuclear halos



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Ependymoma. The true ependymal rosette

# Assignment 2

- Define the following
  1. Watershed infarcts
  2. Pseudolaminar necrosis
  3. Neuritic plaques
  4. Neurofibrillary tangles
  5. Lewy body
- Short notes
  1. Berry aneurysm
  2. Alzheimer's disease

