Strokes part 1

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Outline

1. Epidemiology and some basics
2. Definitions
3. Types of stokes and their pathophysiology.
4. Risk factors

Epidemiology and Basics

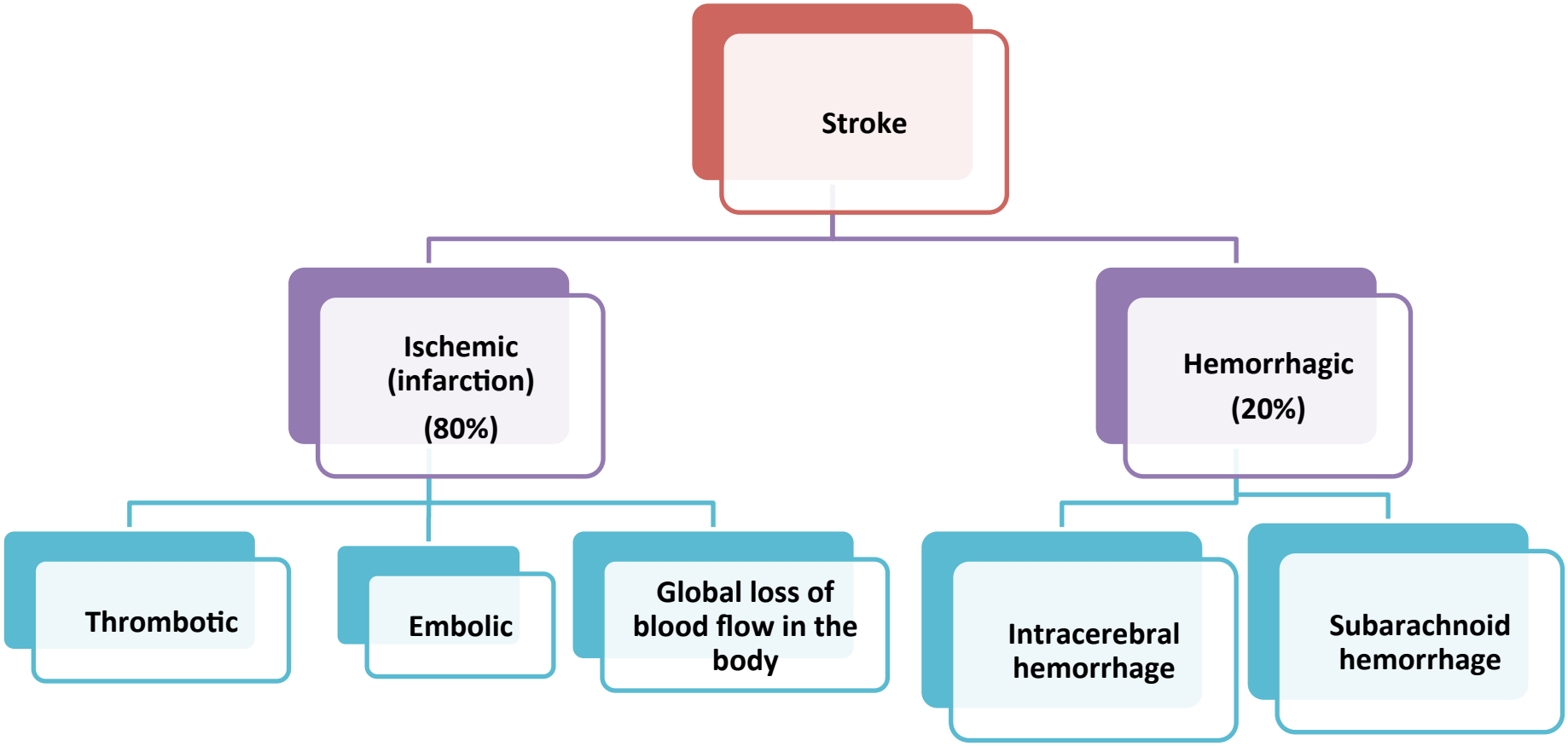
- The annual incidence in the UK varies regionally between 150–200/100 000, with a prevalence of 600/100 000 of which one-third are severely disabled and approximately 20% of patients will die within 30 days.
- The rates increase markedly with advancing age and 20–25% of individuals over the age of 45 years will have a stroke
- Strokes rank third behind heart disease and cancer as a cause of death in affluent societies.
- Approximately one-third of all ‘strokes’ are fatal.

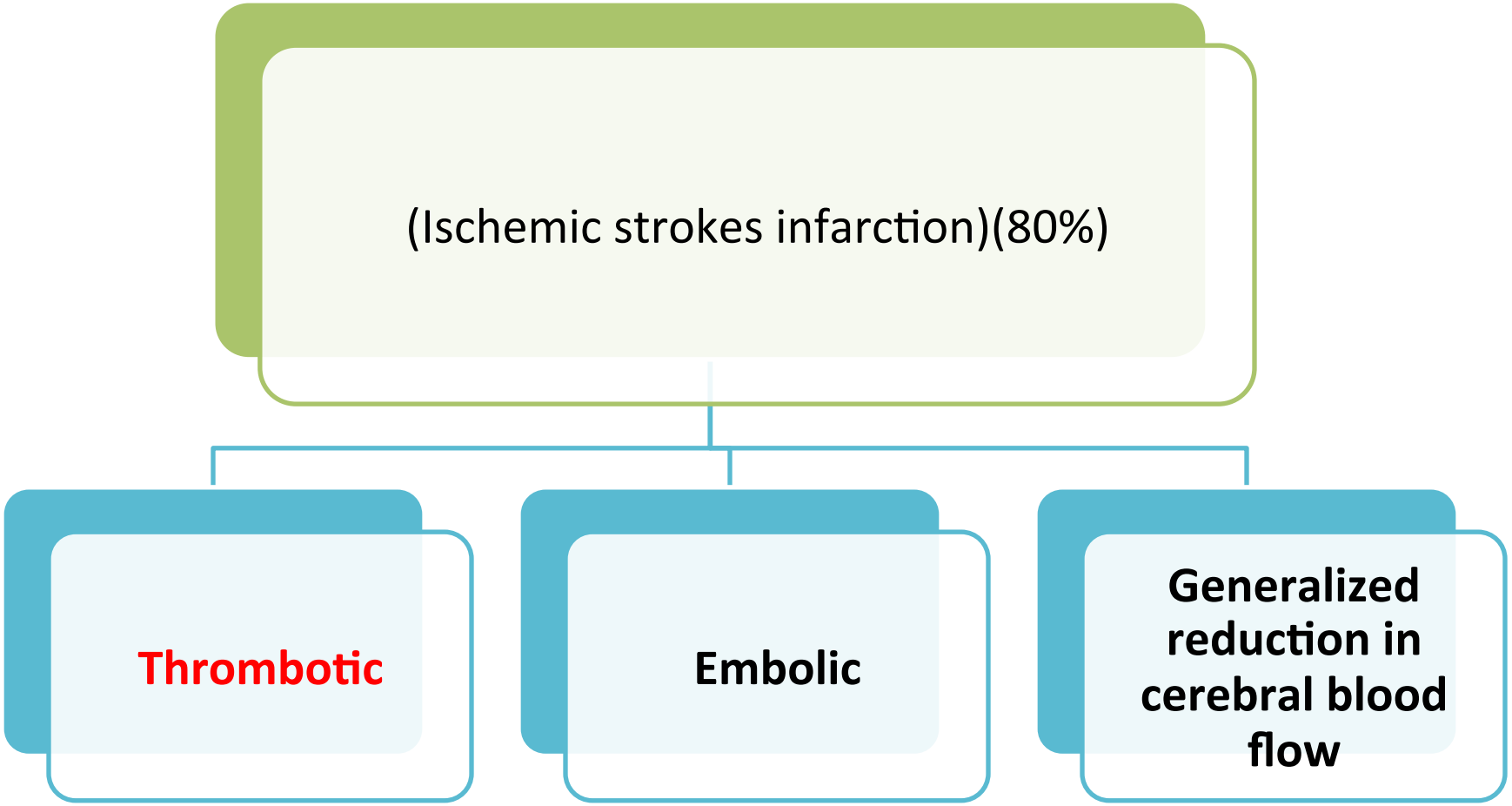
- Stroke is characterized by the rapid appearance (usually over minutes) of a focal neurological deficit.
- Provided that there is a clear history of a rapid onset focal deficit the chance of the brain lesion being anything other than vascular is 5% or less.

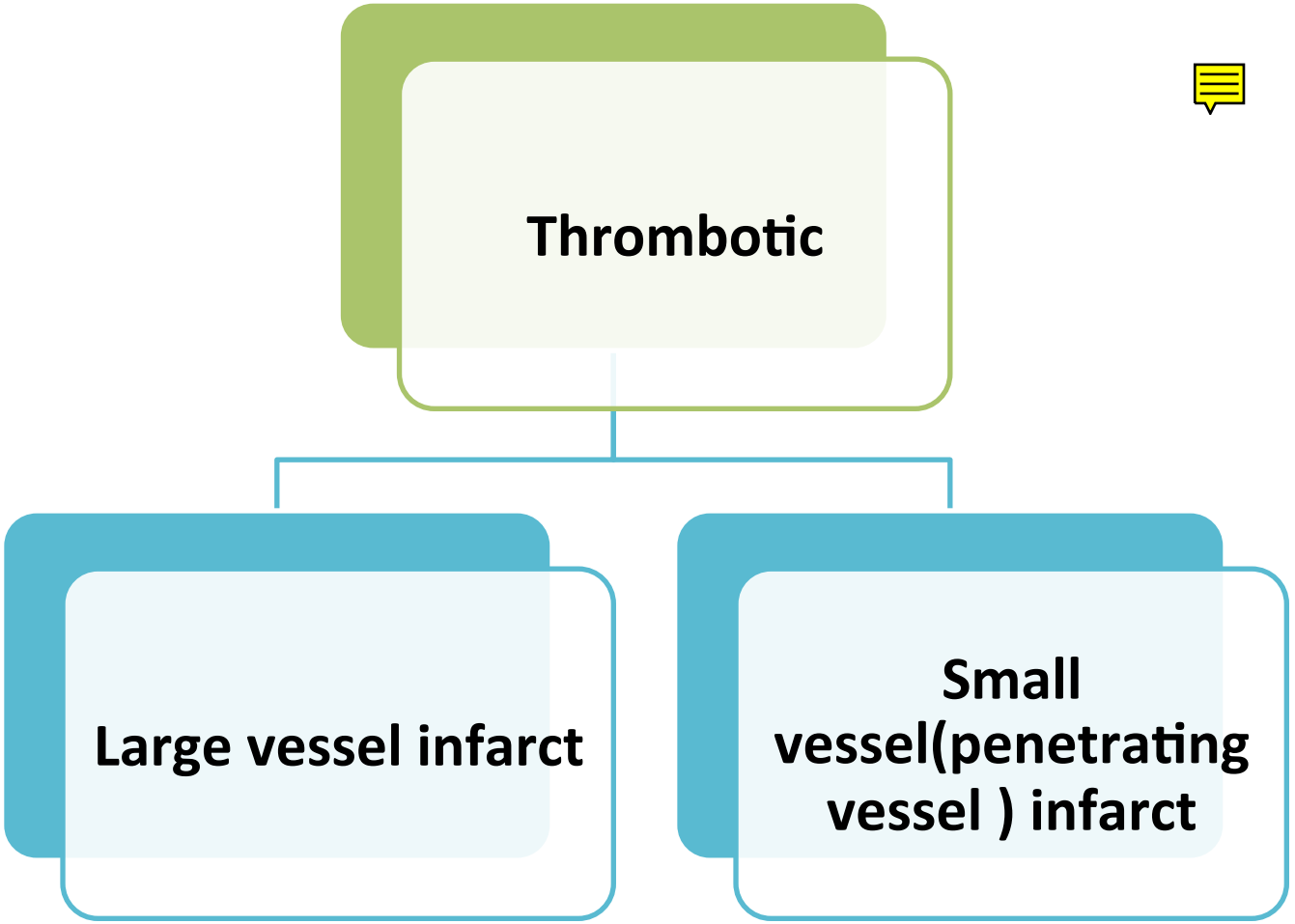
Definitions

- Transient ischemic attack (TIA): a stroke in which symptoms resolve within 24 hours.
- Stroke: a stroke in which symptoms resolve within more than 24 hours.
- Progressive stroke(stroke in evolution): a stroke in which the focal neurological deficits worsens after the patient first presents.
- Completed stroke: A stroke in which the focal neurological deficits persist but are not progressing.

Classification of strokes

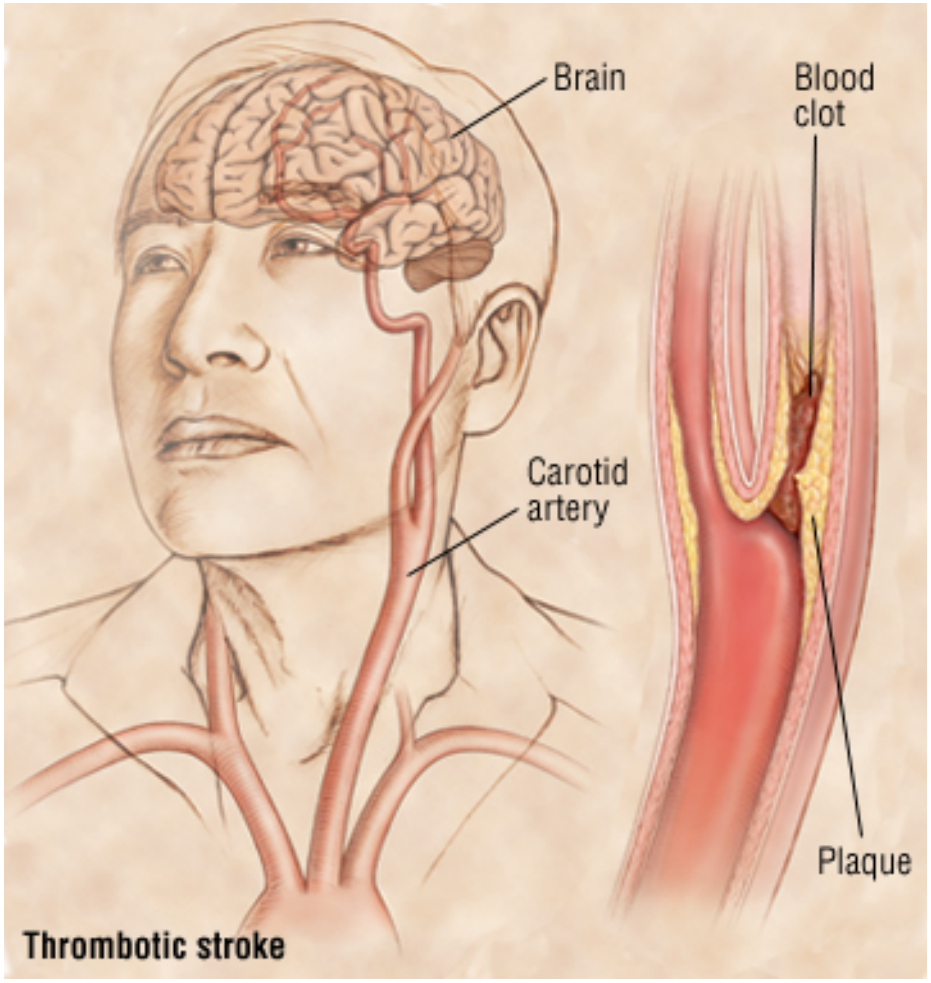



(Ischemic strokes infarction)(80%)
Thrombotic
Embolic
Generalized reduction in cerebral blood flow


Thrombotic
Large vessel infarct
Small vessel(penetrating vessel) infarct

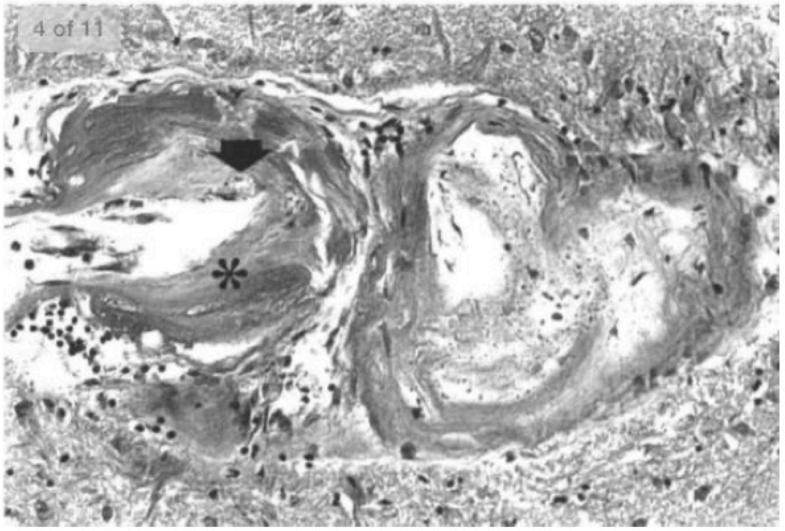
1-Large vessel infarct

- Atherosclerosis:
- It causes thrombotic stroke in large extracranial arteries, most commonly the bifurcation of the carotid arteries or intracranial arteries arising from the circle of Willis, especially the origin of the middle cerebral artery.



2- Small vessel infarct (lacunar infarct)

- Infarcts affecting small perforating arteries that supply structures deep to the cortex like:
  1. The basal ganglia
  2. The internal capsule
  3. Pons.
- Microatheroma. Or
- Lipohyalinosis : It usually occurs in patients with chronic untreated hypertension. DM is also another risk factor.

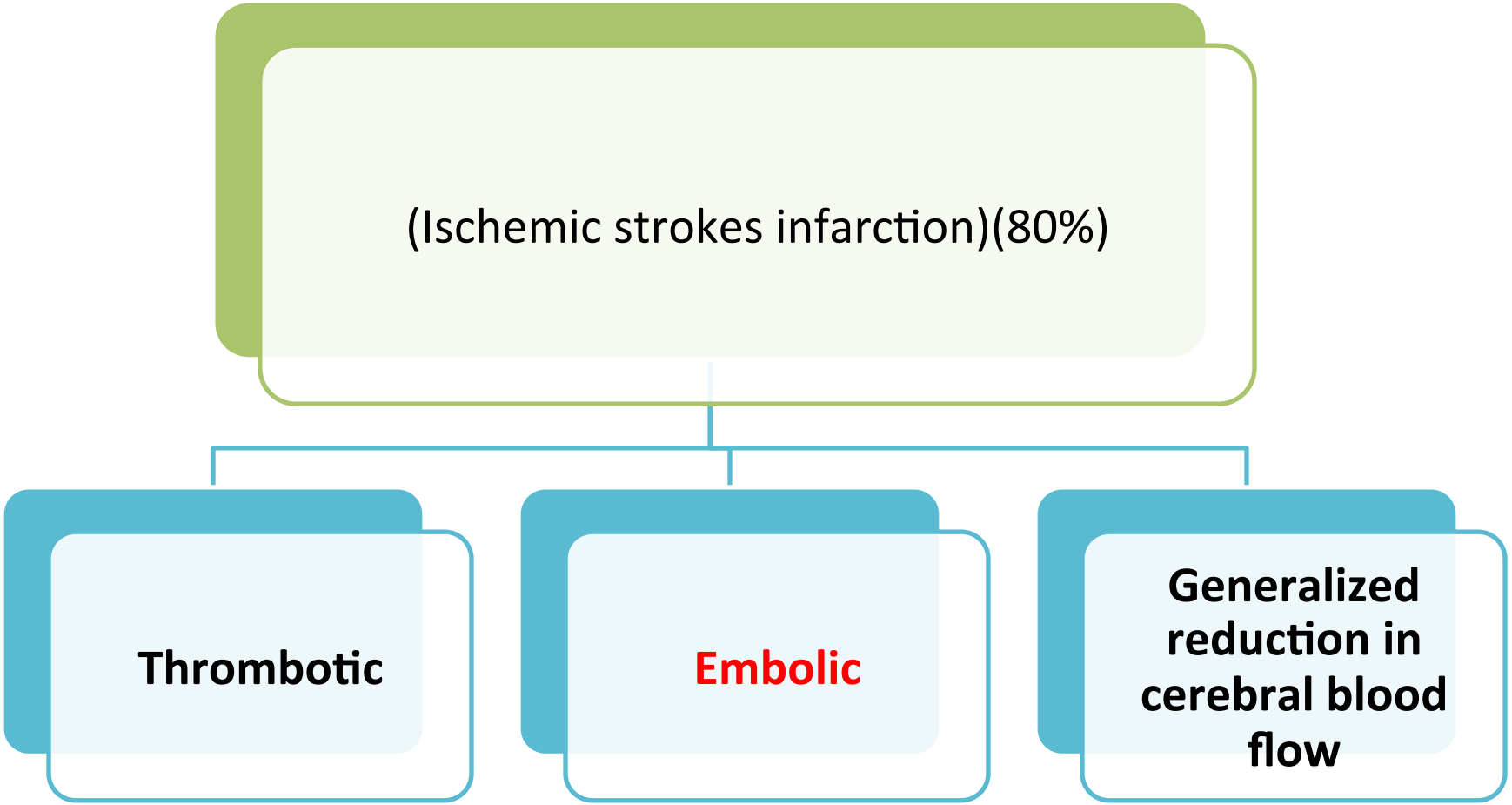


Continue:lacunar infarct

- Embolism
- Micro- aneurysms -> hemorrhagic stroke

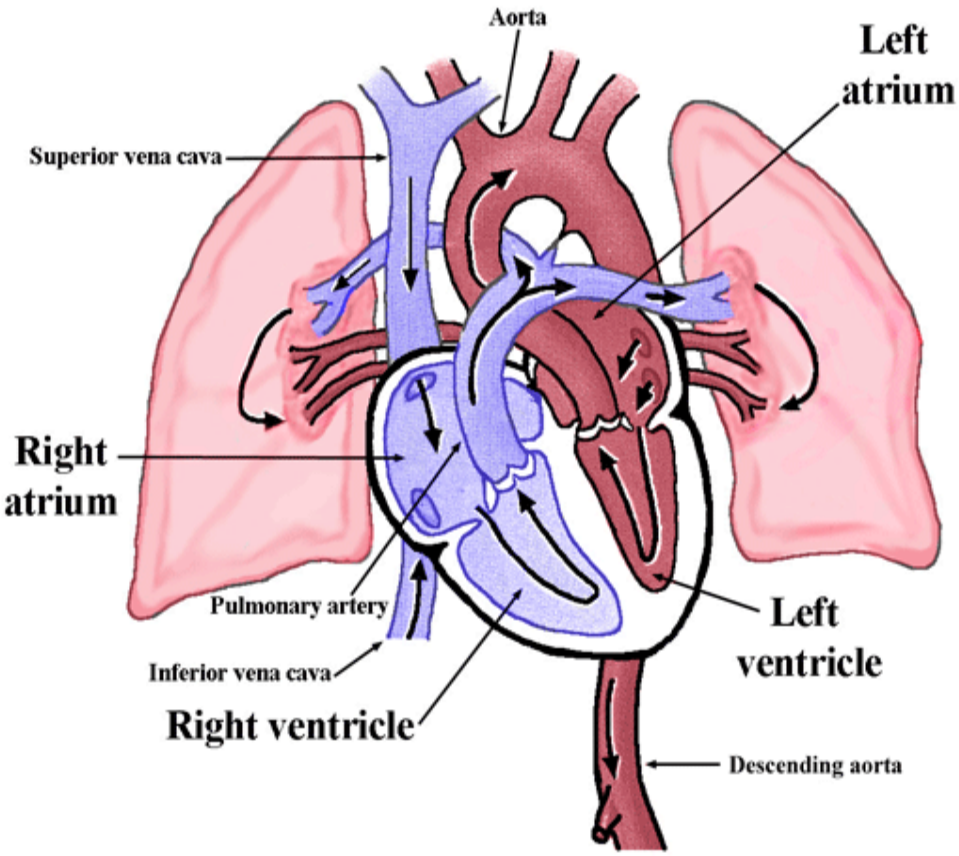
- Occlusion of these penetrating arteries causes subcortical infarcts, less than 1.5 cm in diameter, which are called ‘lacunes’.

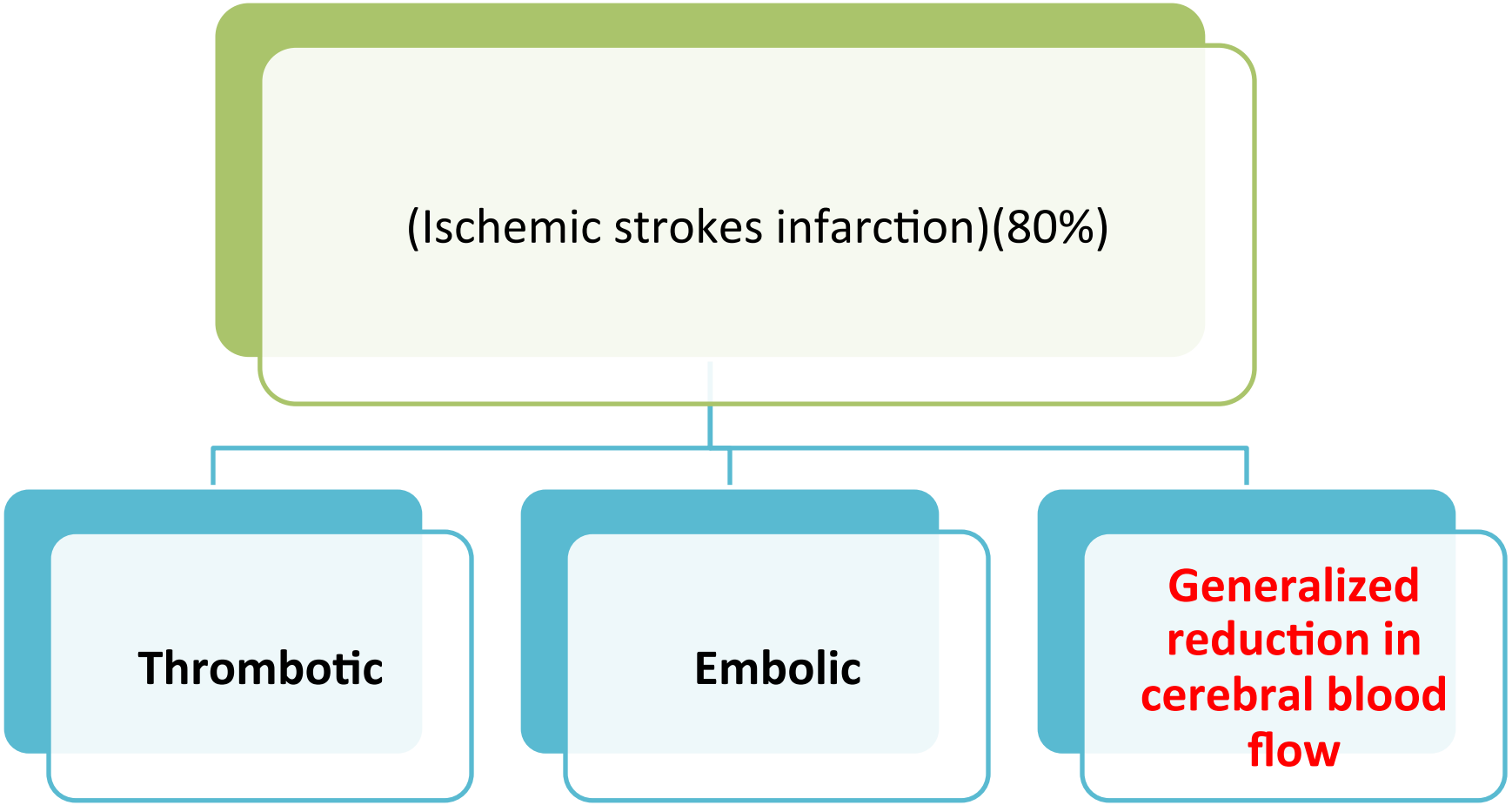
- The most common lacunar syndromes are the following:
  (1) pure motor hemiparesis
  (2) pure sensory stroke
  (3) ataxic hemiparesis
  (4) dysarthria and a clumsy hand


(Ischemic strokes infarction)(80%)
Thrombotic
Embolic
Generalized reduction in cerebral blood flow

Embolic strokes

1. Cardiac or aortic emboli:
   - A.Thrombo-emboli (AF, ventricular hypokinesis, prosthetic valves, marantic endocarditis)
   - B.Atheroemboli (aortic arch atherosclerosis)
2. Infectious emboli (bacterial endocarditis)
3. Paradoxical emboli (via patent foramen ovale).




(Ischemic strokes infarction)(80%)
Thrombotic
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Generalized reduction in cerebral blood flow
(watershed infarct- border zone infarct)

- **Watershed zones:**

  Between anterior cerebral/ middle cerebral, posterior cerebral/middle cerebral arteries.

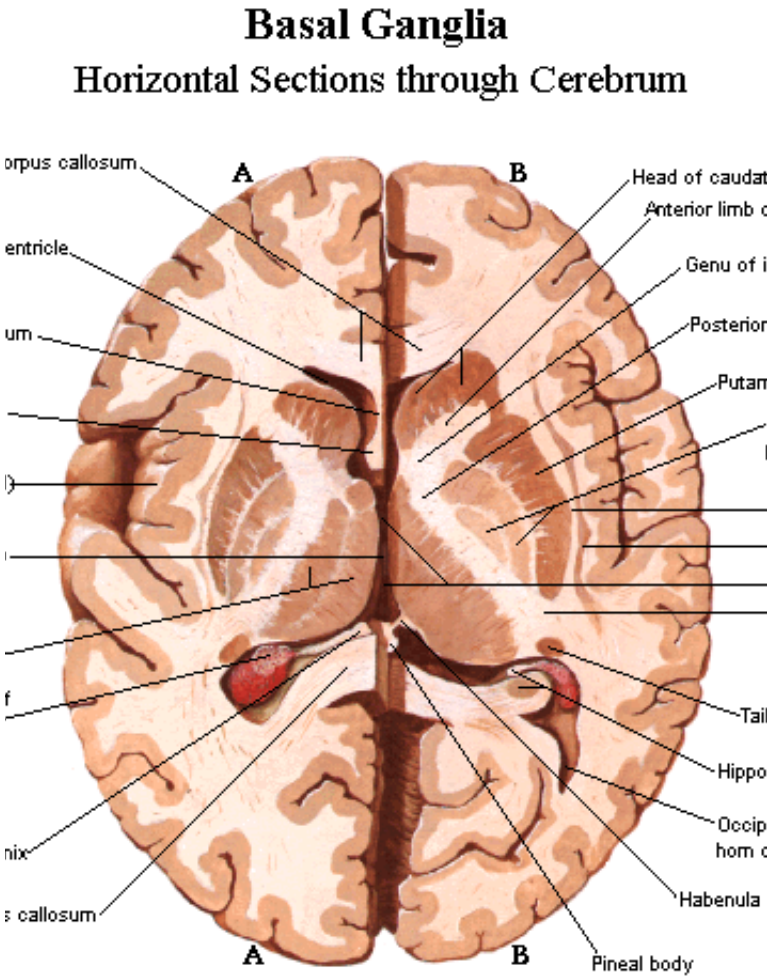
  - **Causes include:**

    1.Hemodynamic shock.

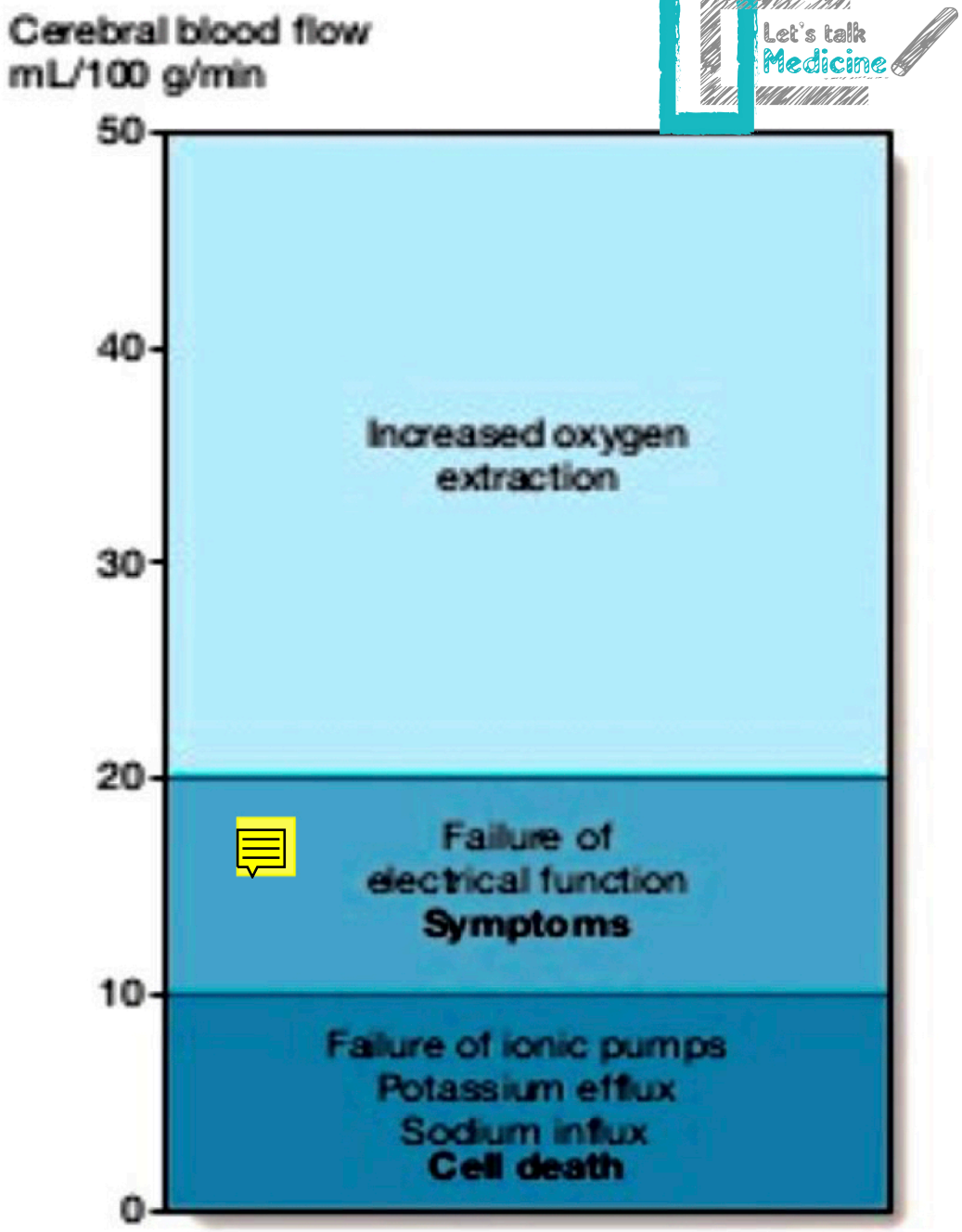
    2.Cardiac arrhythmias.

    3. Septicemia

    4. Narcotic overdose

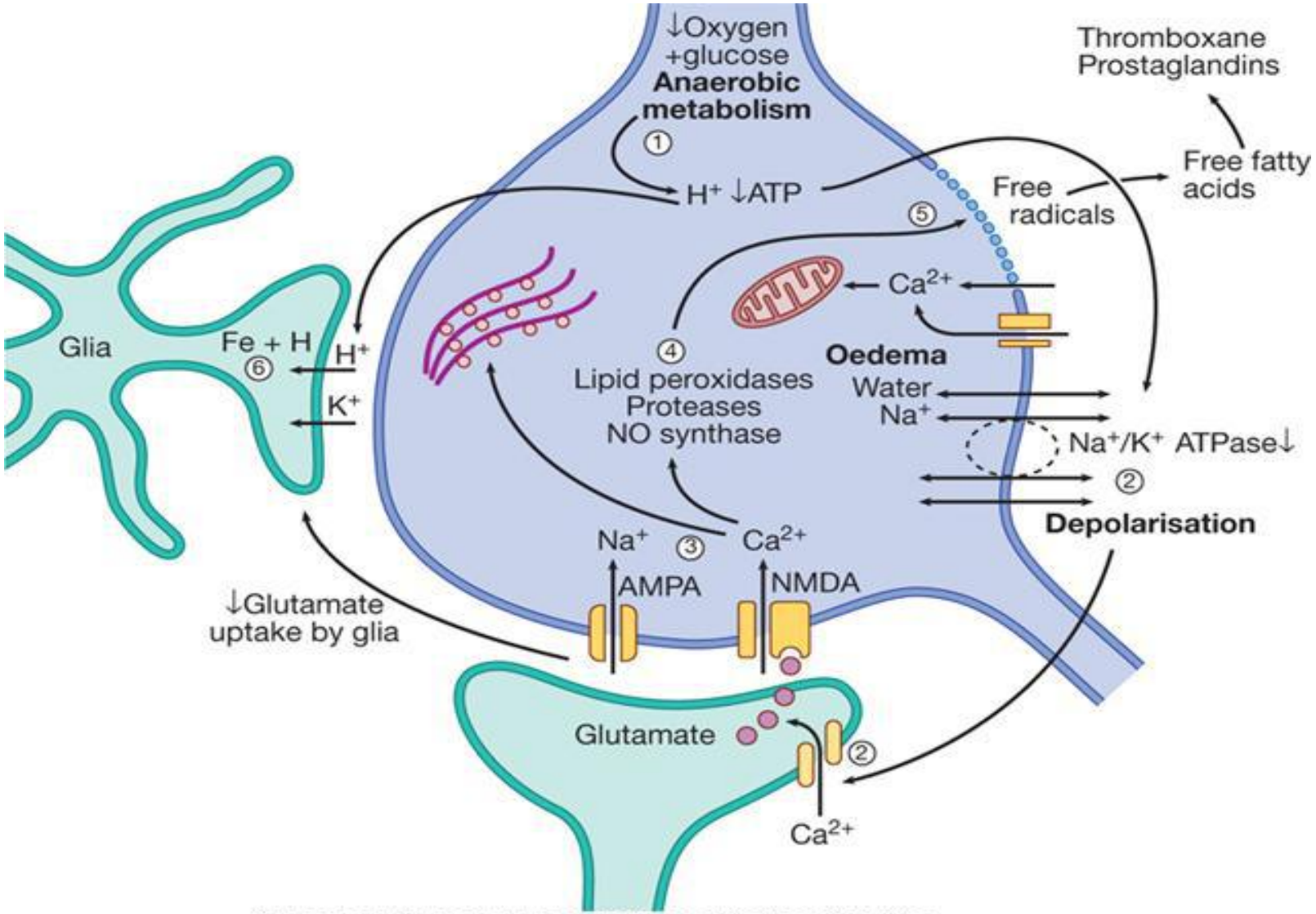


Pathophysiology

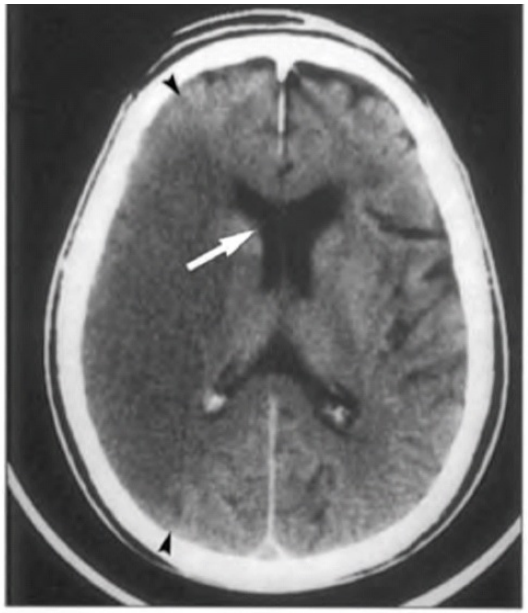


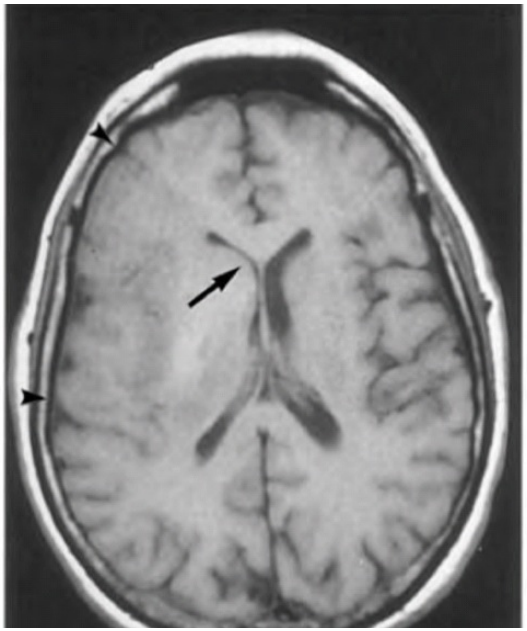
Pathophysiology

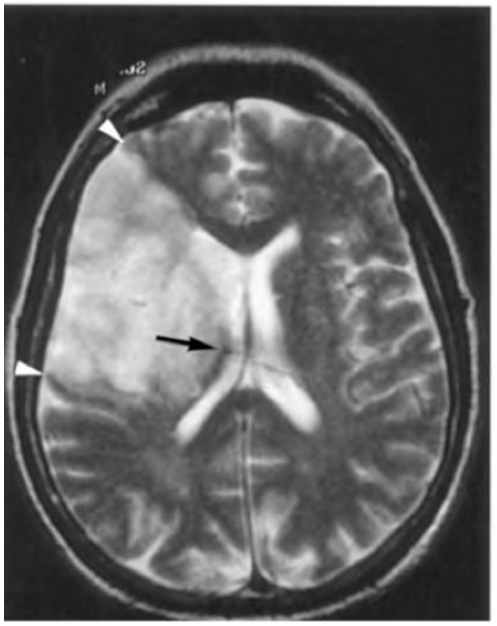
- **TIA :**
- Here the blood flow falls bellow the level of maintenance of electrical activity, and neurological deficits appear.
- At this level of blood flow, the neurons are still viable; if the blood flow increase again, function returns and the patient will have had a TIA.

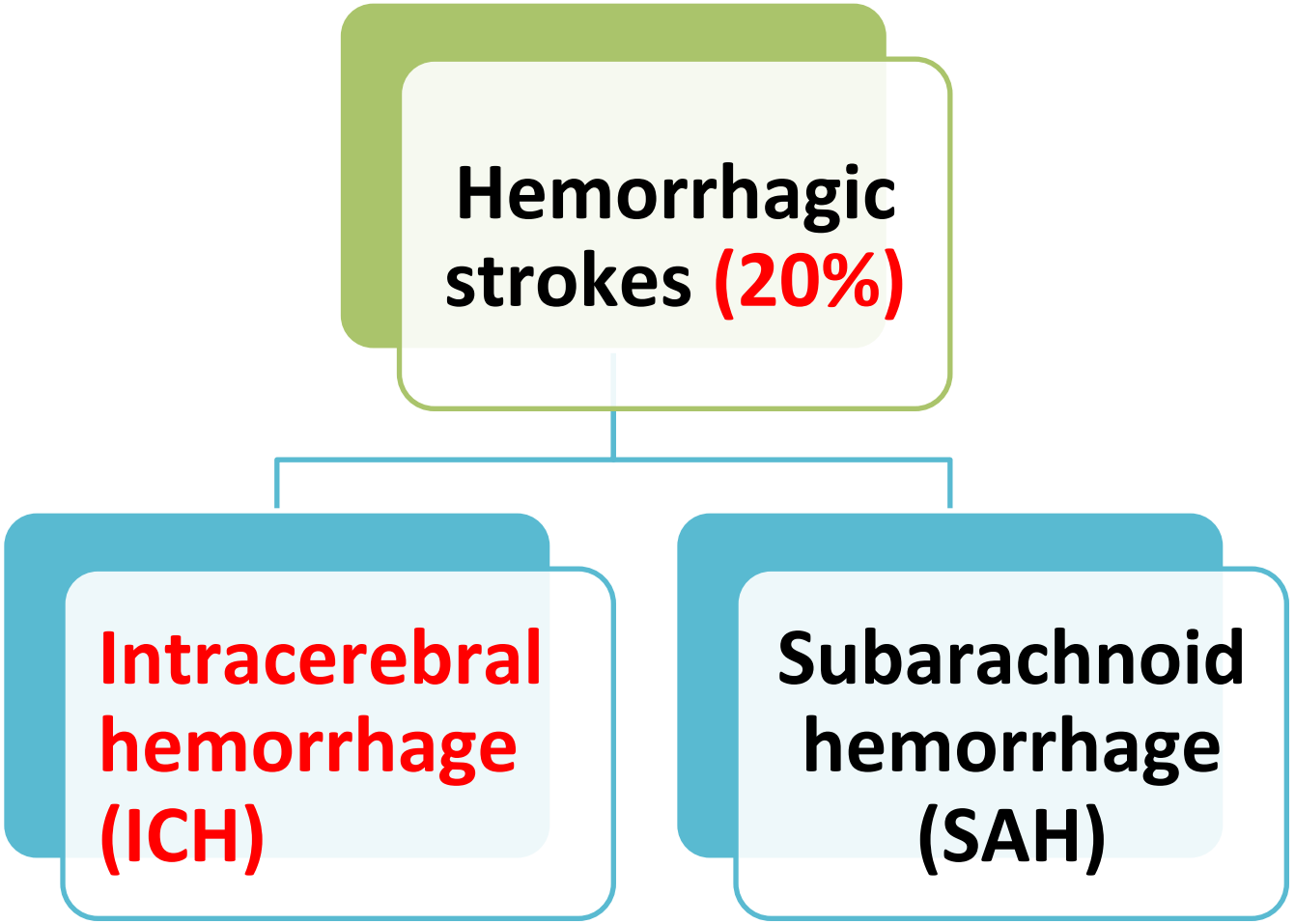


CT\ diffusion weighted MRI of an ischemic stroke





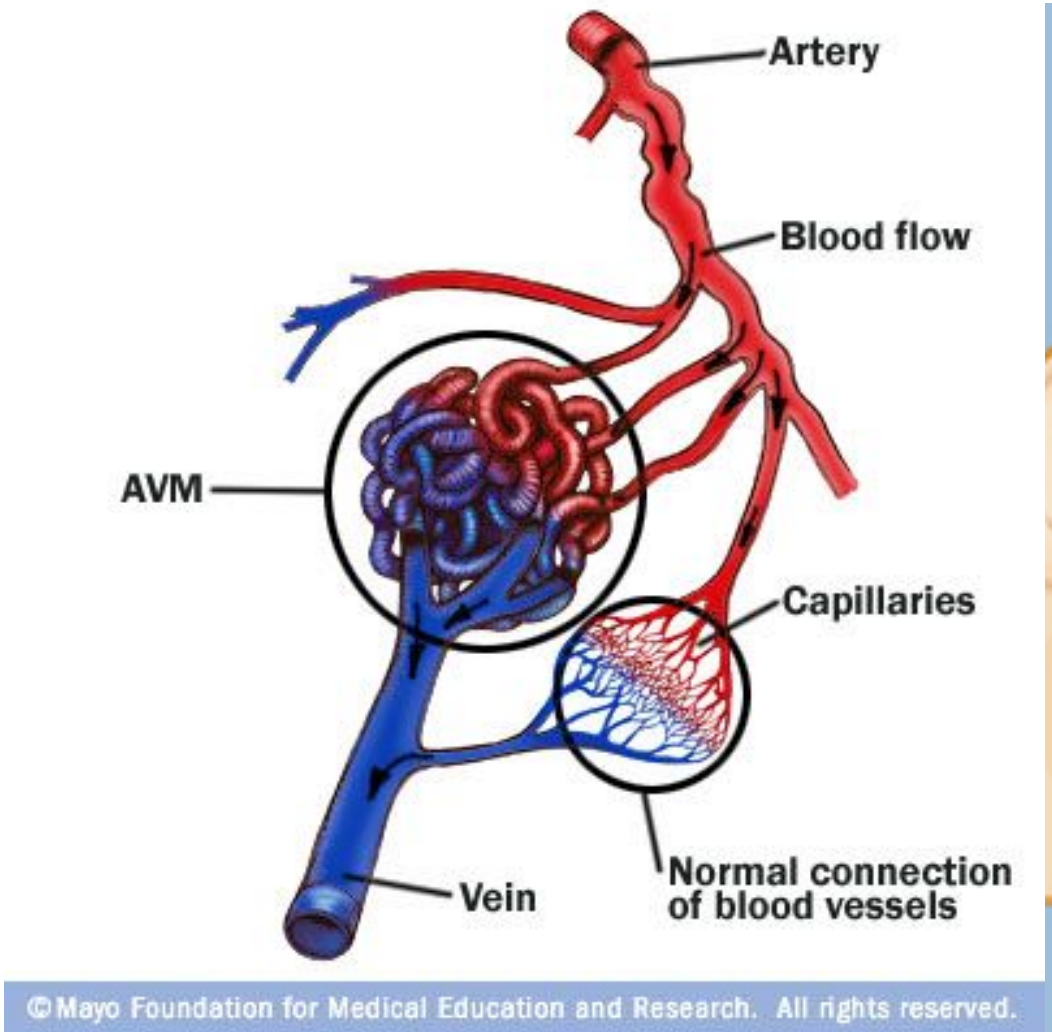


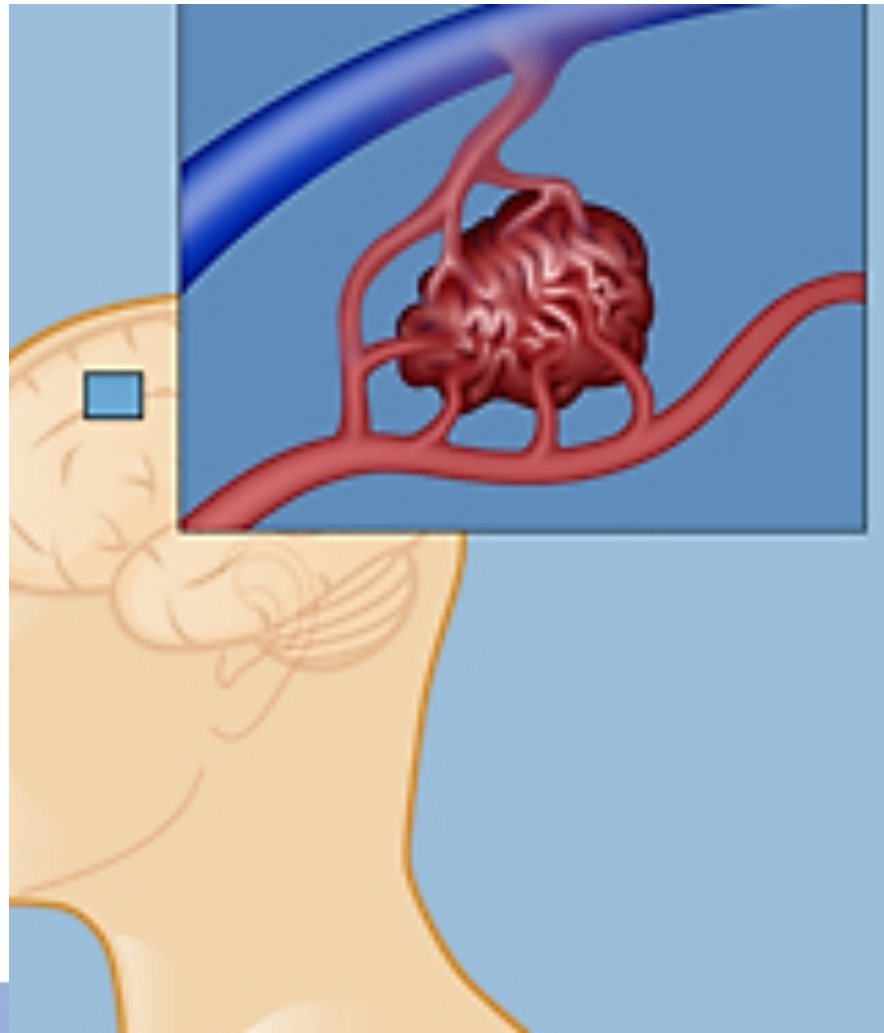

Hemorrhagic strokes (20%)
Intracerebral hemorrhage (ICH)
Subarachnoid hemorrhage (SAH)

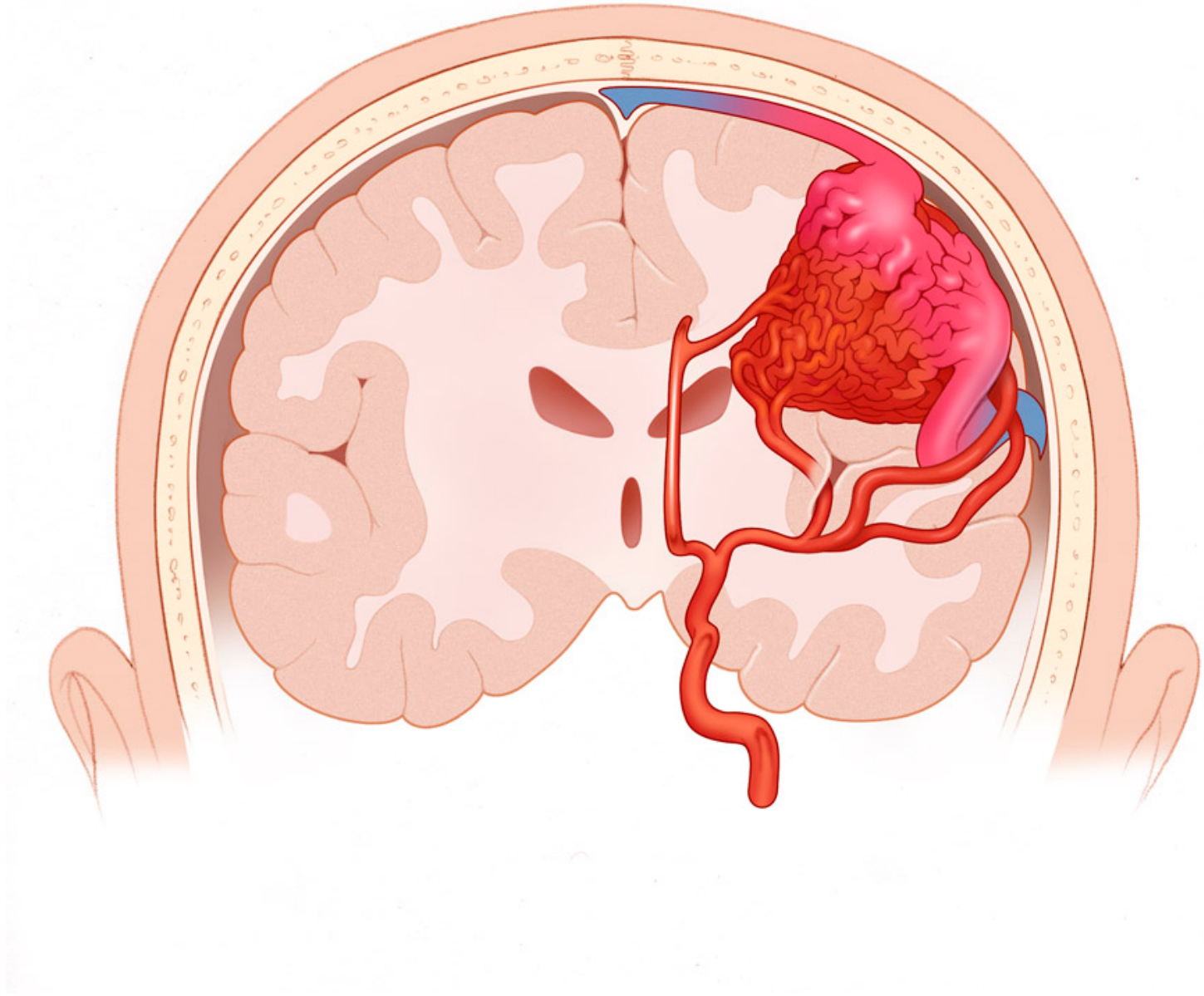
Intracerebral hemorrhage (ICH)

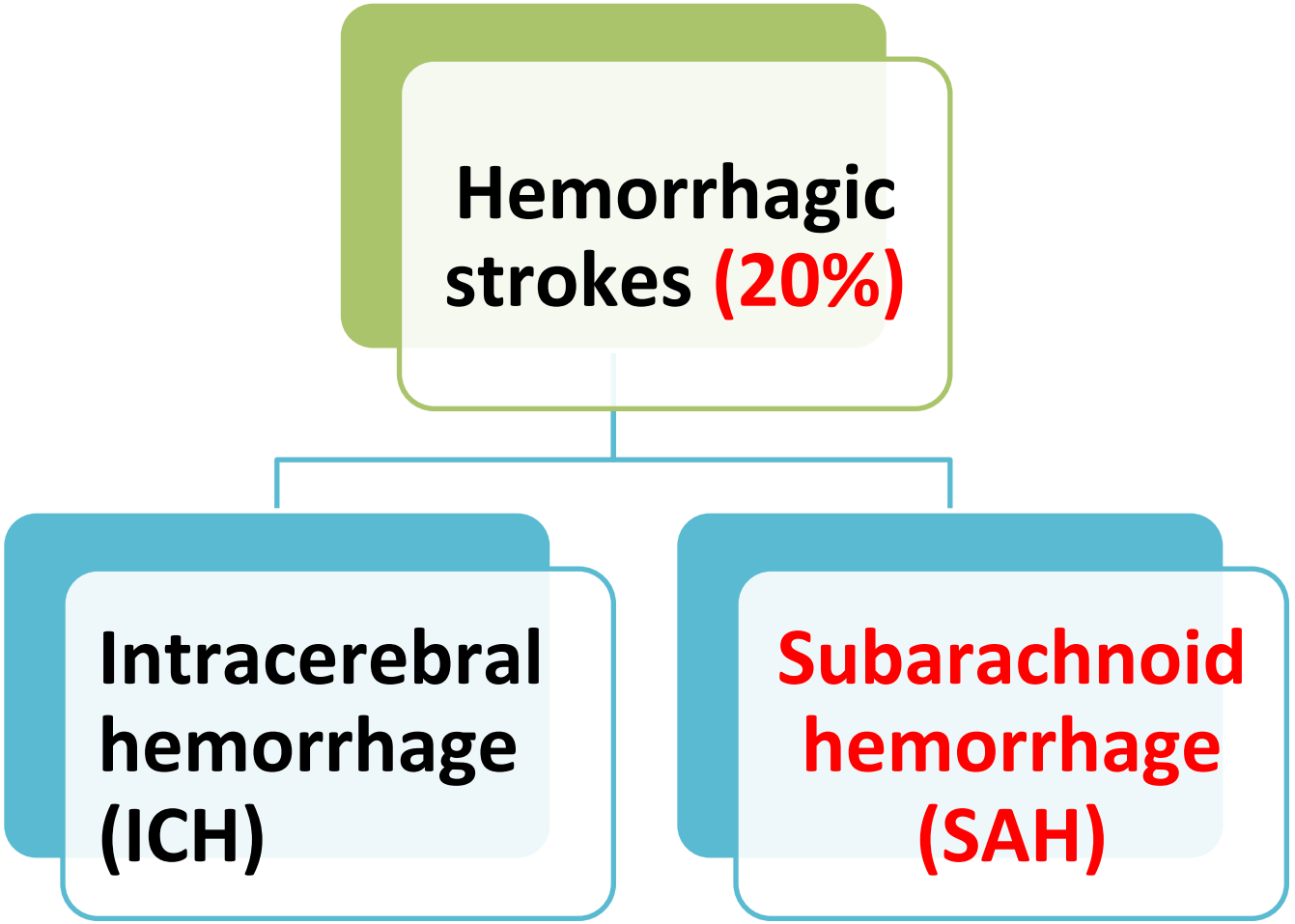
- Definition: bleeding into the brain parenchyma.
- Causes include:
  - A. Traumatic causes.
  - B. Non traumatic causes
    - ❑ Chronic hypertension.
    - ❑ Vascular malformations.
      - I. Arteriovenous malformation
      - II. Cavernous hemangiomas
    - ❑ Bleeding disorders\ anticoagulation therapy.
    - ❑ Amyloid angiopathy (in the elderly).

Arteriovenous malformation








Hemorrhagic strokes (20%)
Intracerebral hemorrhage (ICH)
Subarachnoid hemorrhage (SAH)

Subarachnoid hemorrhage

- Note: subarachnoid hemorrhage is caused by spontaneous rather than traumatic arterial bleeding into the subarachnoid space
- Causes include:
    1. Ruptured intracranial aneurysm represent (85%)of the cases
    2. Non aneurysmal perimesencepahlic hemorrhage (hemorrhage into the basal cisterns) 10%
    3. Arteriovenous malformation

Subarachnoid hemorrhage

- **Risk factors for subarachnoid hemorrhage:**
  1. **Family history\ genetic factors**
  2. **Smoking**
  3. **Hypertension**
- **Symptoms of subarachnoid hemorrhage:**

❑Severe, **abrupt** onset headache.

❑***"thunderclap headache"*** often followed by neck stiffness.

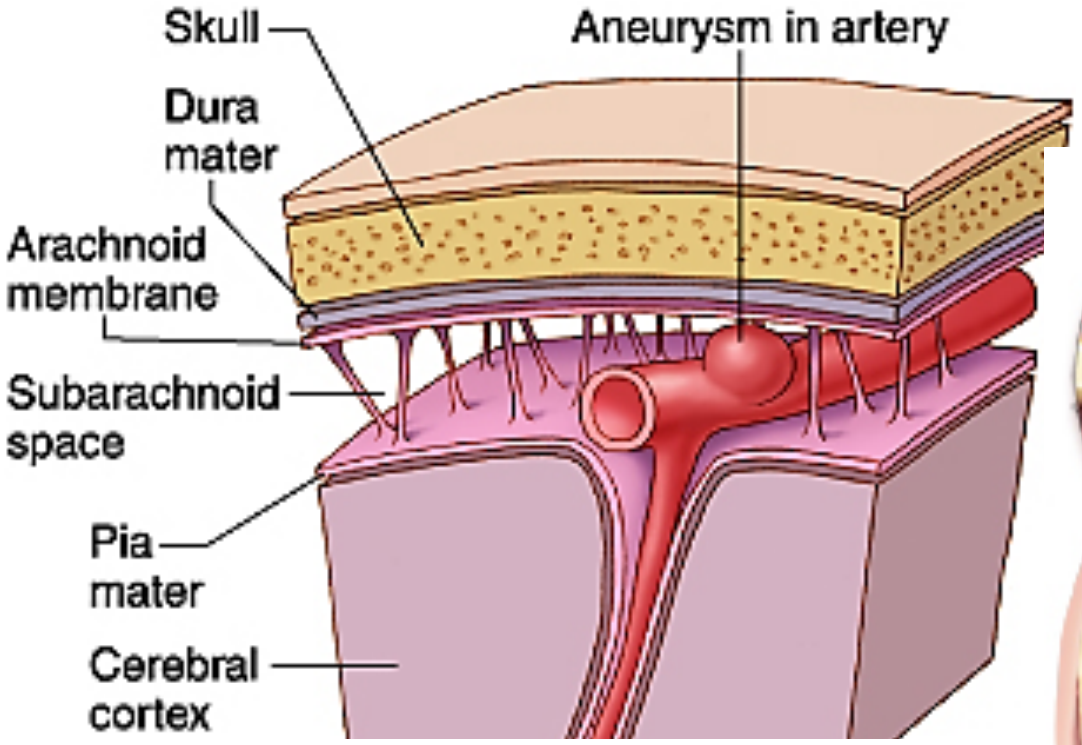
❑(like a sudden ***" blow to the head")***

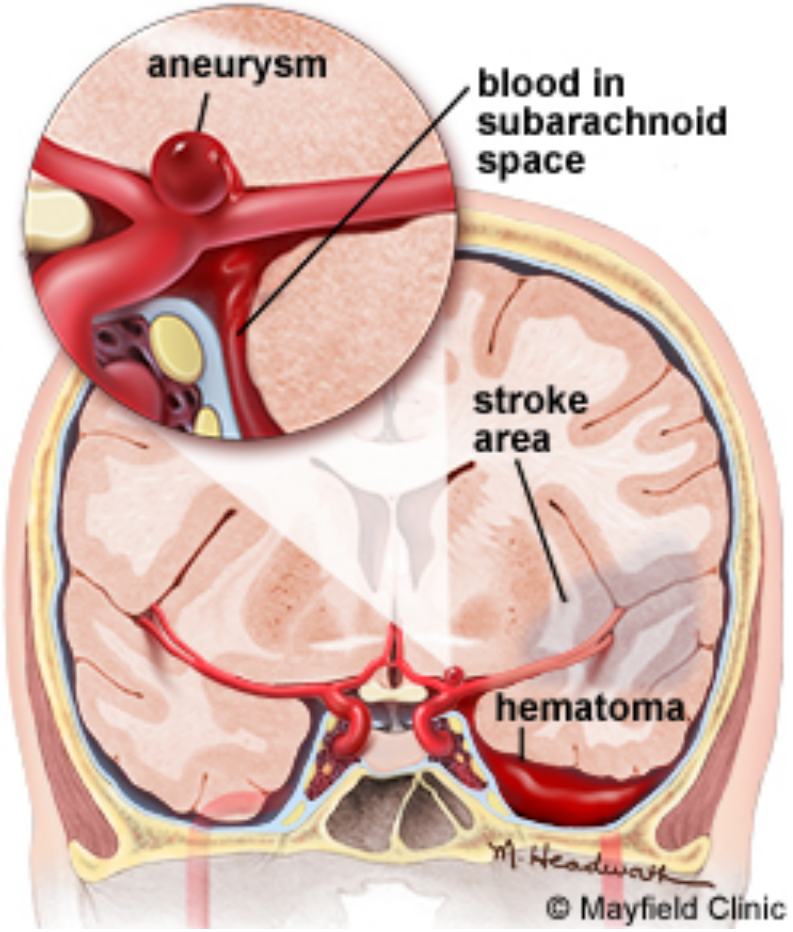
❑***"worst headache of my life"***

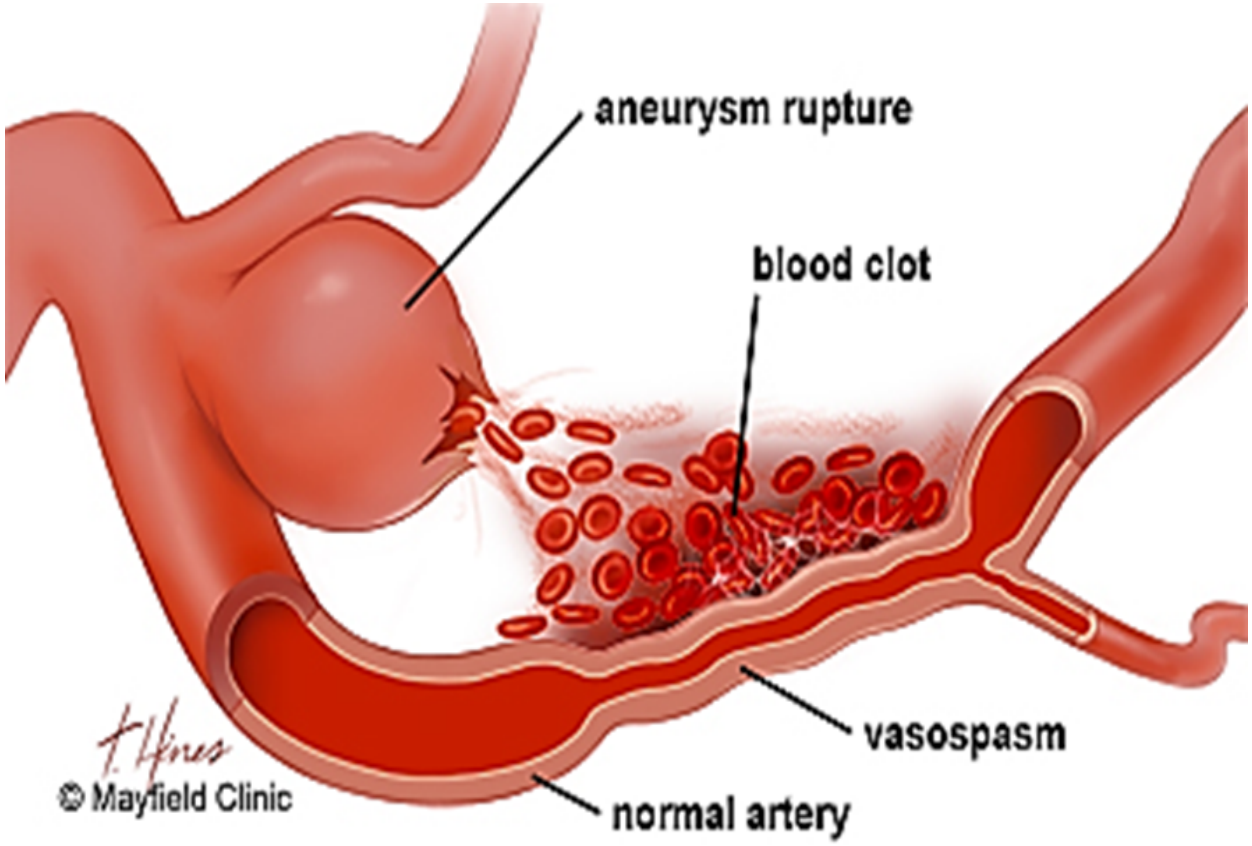
Saccular (Berry) aneurysm

- ***the most common site of aneurysms is at the location of the anterior communicating artery.***
- Risk factors for berry aneurysms:
    1. Smoking.
    2. Hypertension.
    3. Adult polyposis kidney disease.
    4. Marfan's syndrome.
    5. Ehlers- Danlos syndrome.

Ruptured intracranial aneurysm






aneurysm rupture
blood clot
vasospasm
normal artery
T. Hines
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Risk factors

- **NONMODIFIABLE RISK FACTORS**

  1.Age > 60

  2.Family history of MI or stroke

  3.Male gender

  4. Ethnicity (African-American, Hispanic, Asian)

Risk factors

- **MODIFIABLE RISK FACTORS**
  "Live the way a COACH SHoulDD":
- CAD
- Obesity
- Atrial fibrillation
- Carotid stenosis
- Hypercholesterolemia
- Smoking
- Hypertension
- Diabetes
- Drug use (cocaine or IV drugs)

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