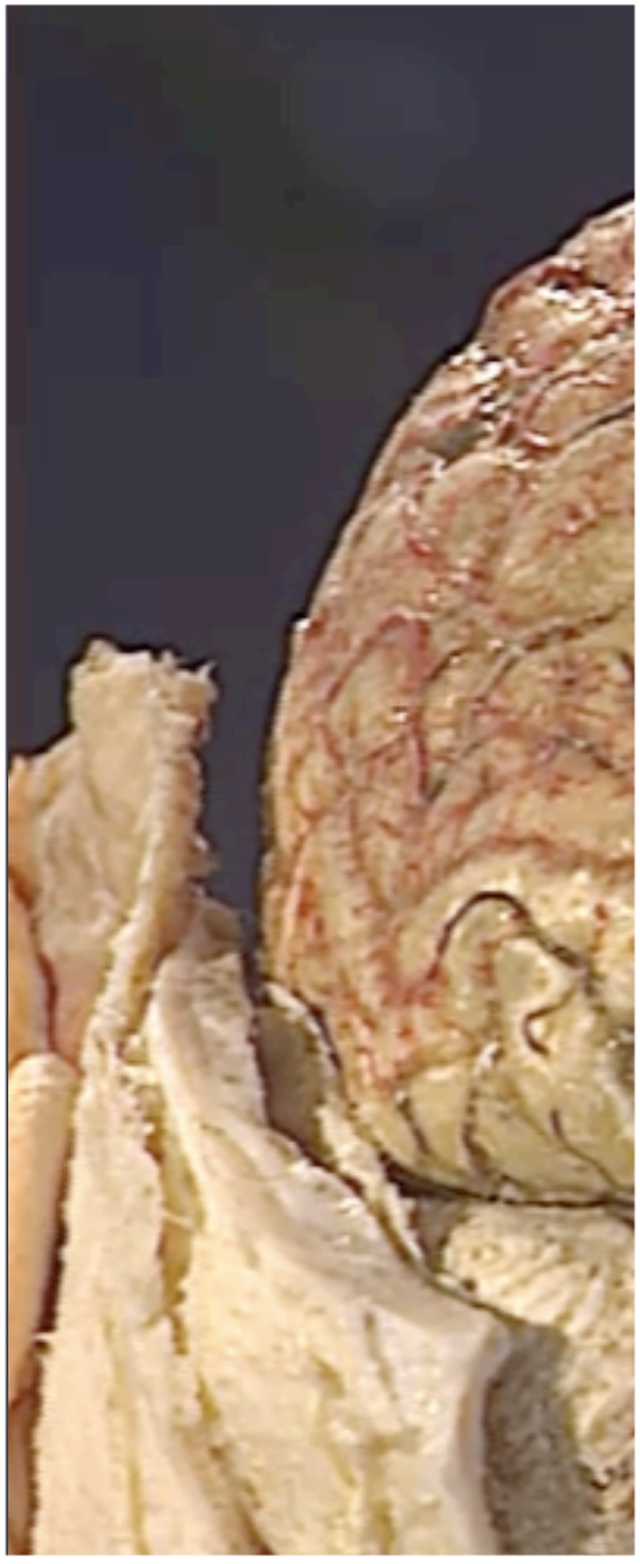

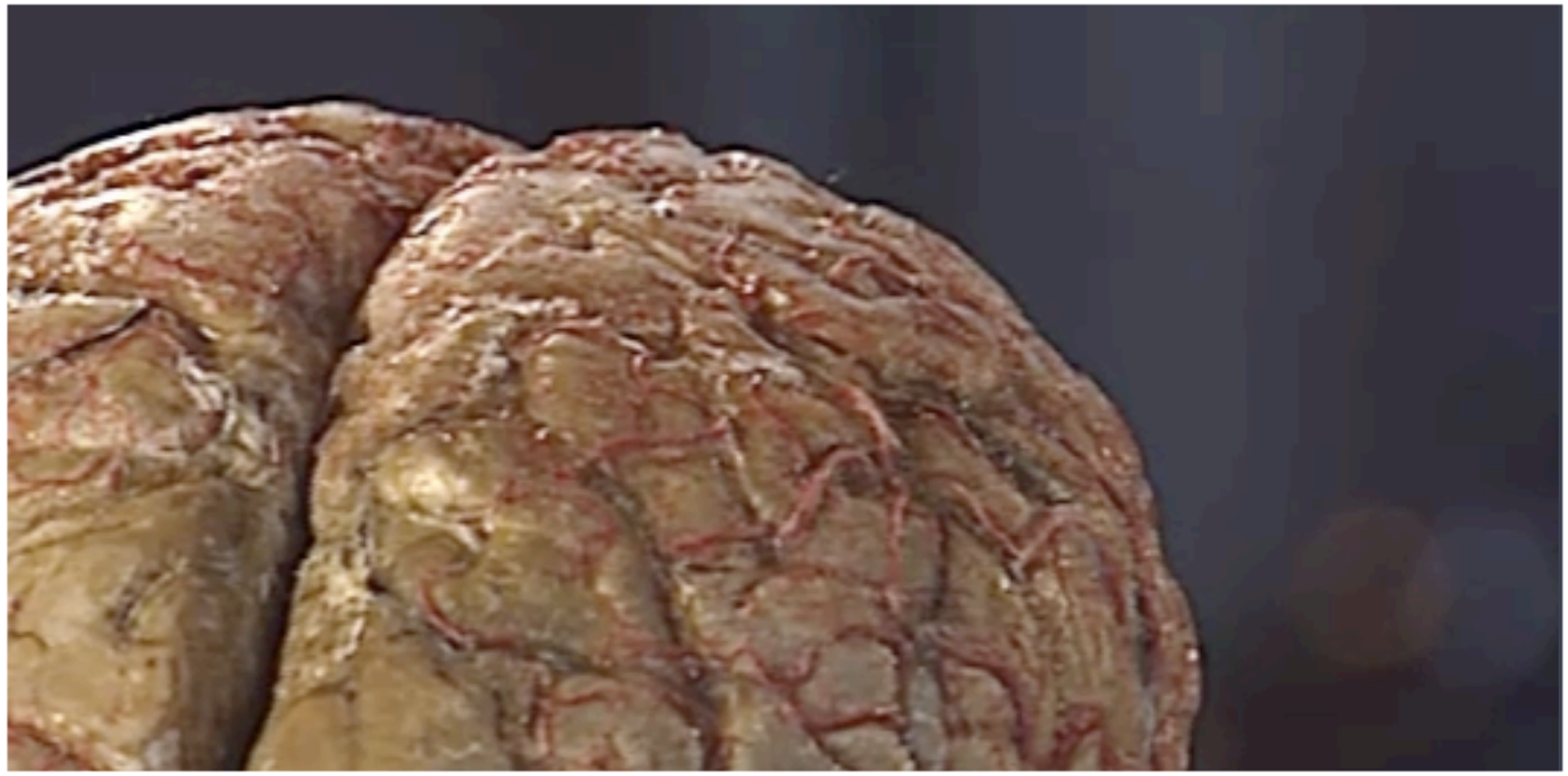

Stroke

Mr Colin Dibble
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North Manchester General Hospital

Objectives

Understand:

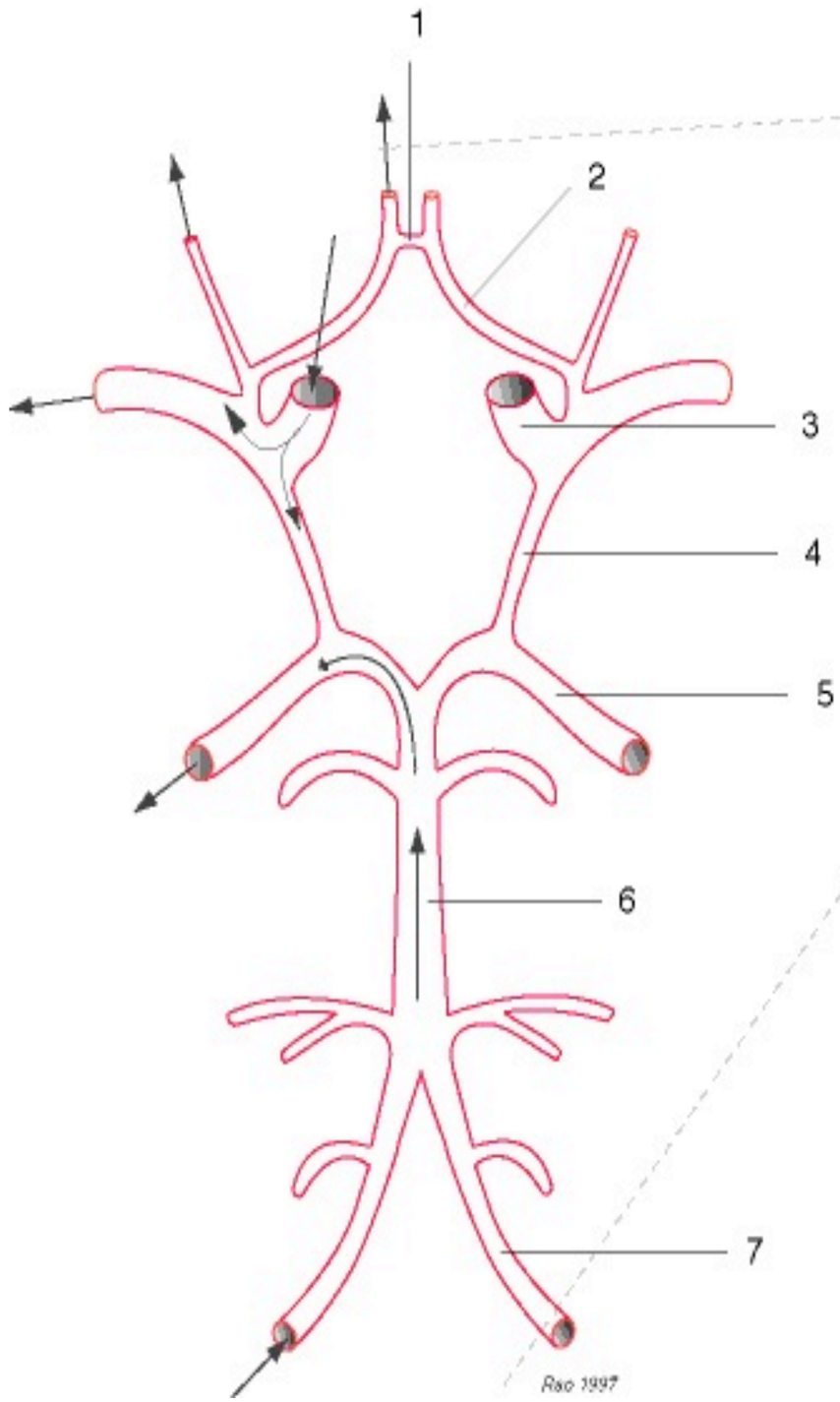
- Anatomy and Pathophysiology of the brain
- Stroke Territories
- Haemorrhagic stroke
- Cerebral Infarction
- Management of CVA
- Management of TIA

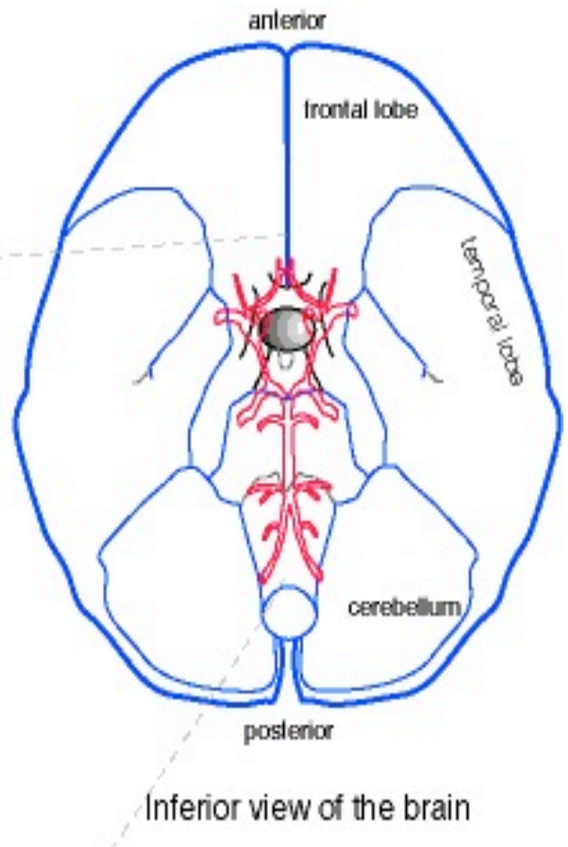
Introduction

- Oct 06-Oct 07 at NMGH there were 333 CVA's & 208 TIA's. 1 CVA every 5 minutes in UK
- Third biggest cause of death in UK
- Part of NSF Standards for the Elderly (see here)
- If less than 24 hours=TIA

Anatomy

The Arterial Circle of Willis





Inferior view of the brain

Arteries of the Circle of Willis*

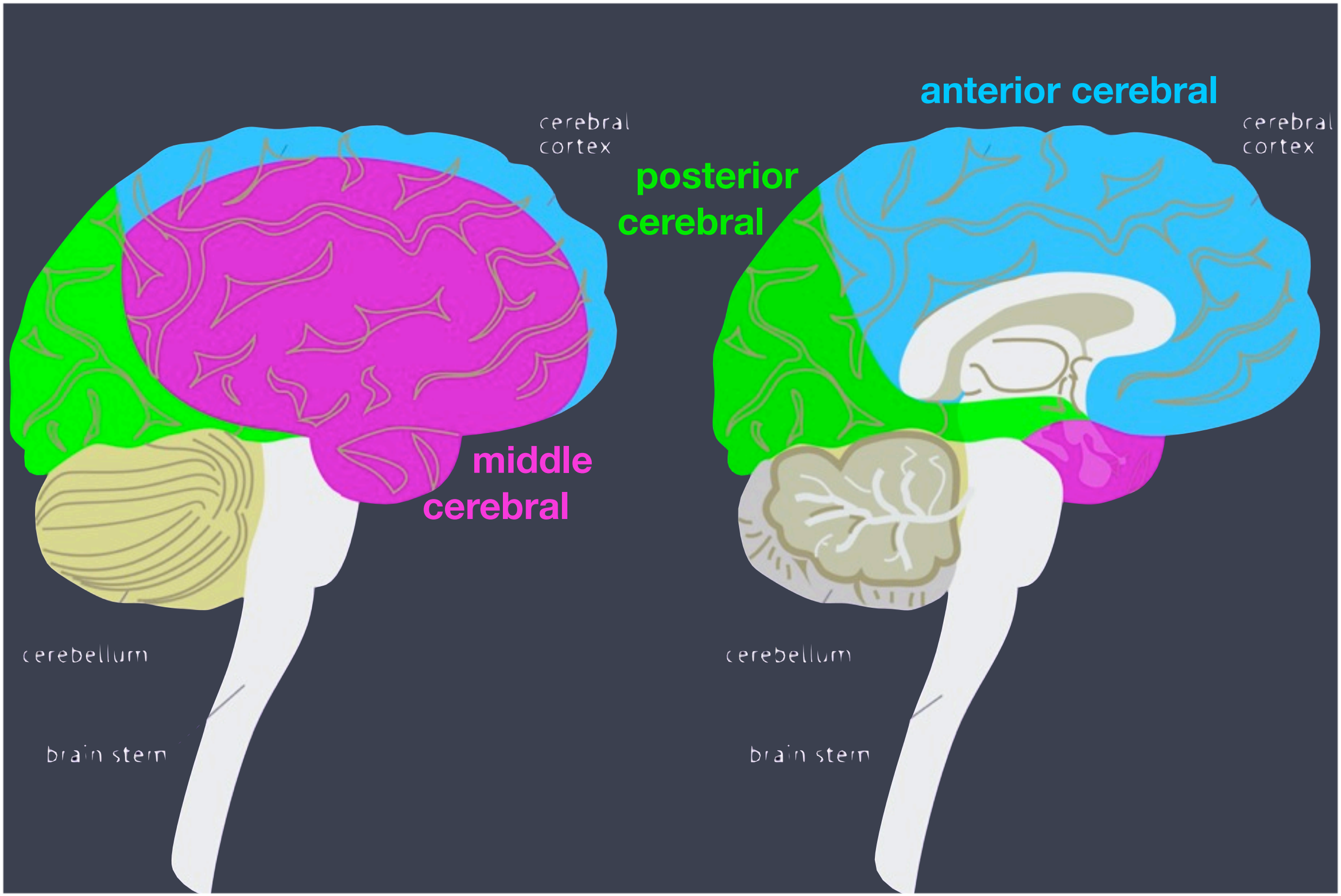
1. Anterior communicating*
2. Anterior cerebral*
3. Carotid
4. Posterior communicating*
5. Posterior cerebral*
6. Basilar
7. Vertebral

Pathophysiology

- Haemorrhagic: eg bleeding from vessel, usually intraparenchymal, from bleeding diathesis, thrombolysis, AVM or hypertension
- Infarction: thrombotic or embolic occlusion of vessel
- Subsequent clinical presentation depends on area supplied

Pathophysiology

- Primary: area with loss of blood supply
- Penumbra: area with reduced but reversible blood flow reduction
- Secondary: further damage of above from hypotension/hypoxia
- Risk factors include: DM, smoking, hypertension, IHD, OCP, polycythaemia, sickle cell disease, Def. Of antithrombin III, Protein C/S, ,prev TIA, carotid bruit


cerebral cortex
posterior cerebral
middle cerebral
cerebellum
brain stem
anterior cerebral
cerebral cortex
cerebellum
brain stem

Anterior cerebral artery

- 2% of infarcts
- These cause contralateral hemiparesis (more in leg than arm), with no/mild sensory deficit.
- Other frontal lobe features include mutism, or dis-inhibition and speech perseveration, primitive reflexes (eg, grasping, sucking reflexes), altered mental status, impaired judgment, contralateral cortical sensory deficits, gait apraxia, and urinary incontinence

Middle cerebral artery

- 90% of infarcts
- Contralateral hemiplegia (more in arm and face), contralateral sensory deficit or, ipsilateral hemianopia, and cognitive defects such as aphasia (dominant hemisphere) or contralateral neglect (non-dominant hemisphere).
- Massive infarction of entire territory may lead to brain swelling & fatal herniation, esp. in young patients without cerebral atrophy.

Lacunar strokes

- 13-20% of infarctions
- occlusion of the small, perforating arteries of the deep subcortical areas of the brain
- 2-20 mm infarctions
- most common include pure motor, pure sensory, and ataxic hemiparetic strokes.

Posterior cerebral artery syndrome

- 5% of infarcts
- May include contralateral homonymous hemianopia (occipital lobe), amnesia (lower temporal lobe), and oculomotor disorders or disturbances of language or visuospatial function, through the involvement of perforating branches to the thalamus.

Vertebral artery

- Wallenberg's syndrome= ipsilateral cerebellar ataxia through infarction of the inferior part of the cerebellum + a slightly bewildering combination of deficits through infarction of the dorsolateral medulla: decreased skin sensation in the ipsilateral half of the face and the contralateral half of the body, ipsilateral Horner's syndrome, ipsilateral weakness of the soft palate, larynx and pharynx, and rotatory vertigo

Basilar artery syndrome

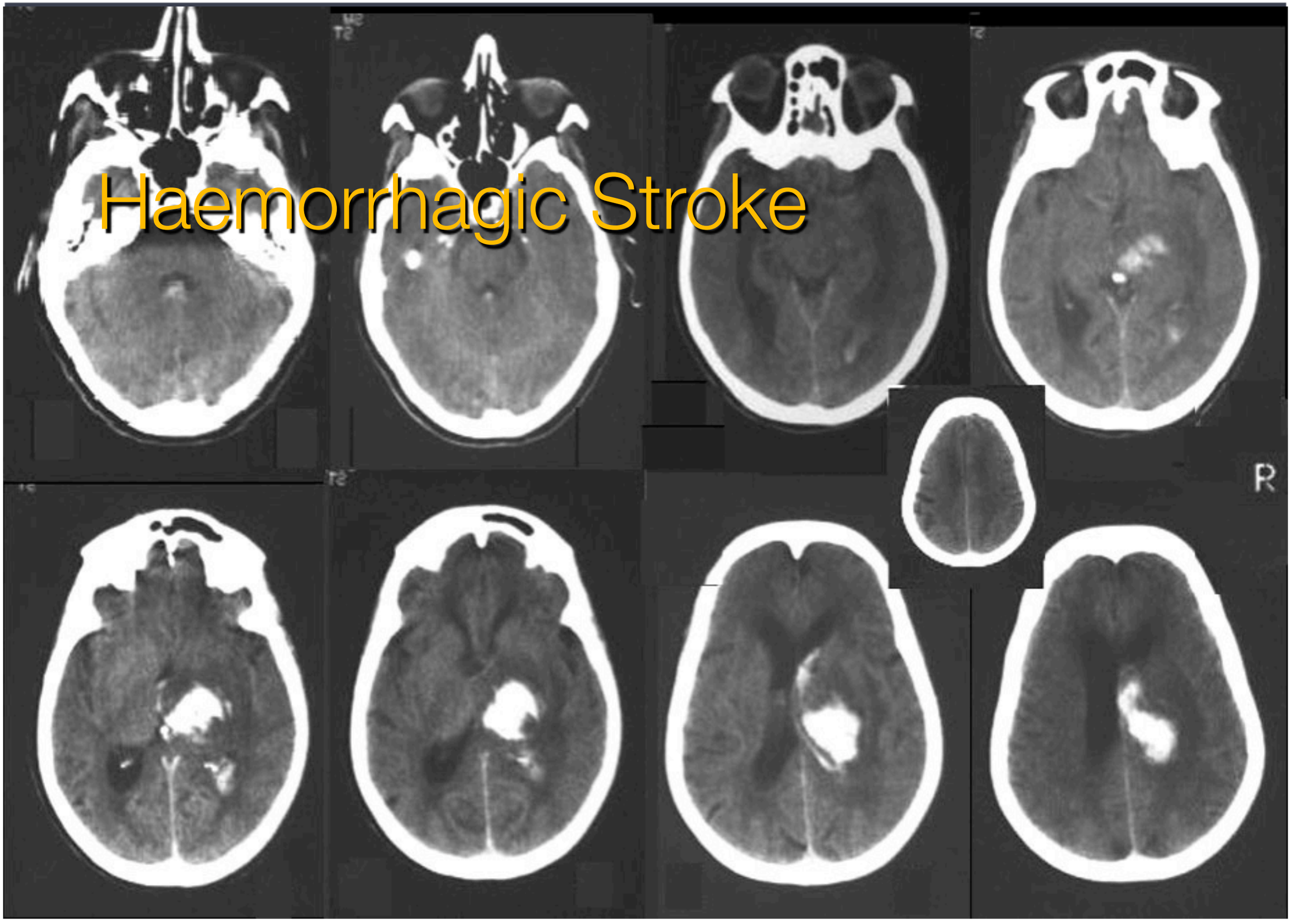
- Full- infarction of most of the pons and midbrain, consists of coma, tetraparesis including facial movements, and loss of all eye movements and of pupillary and corneal reflexes

- Partial syndromes-

  - a. locked-in syndrome (infarction of the base of the pons), with tetraparesis including facial movements and loss of horizontal eye movements. Consciousness is preserved through sparing of the reticular formation, but patients can communicate only through vertical eye movements.

  - b. basilar syndrome, with variable combinations of hemianopia or complete cortical blindness (occipital lobes), amnesia (inferior temporal lobes), as well as vertical gaze palsies, pupillary disturbances, and hallucinations (perforating branches to the midbrain).

Haemorrhagic Stroke

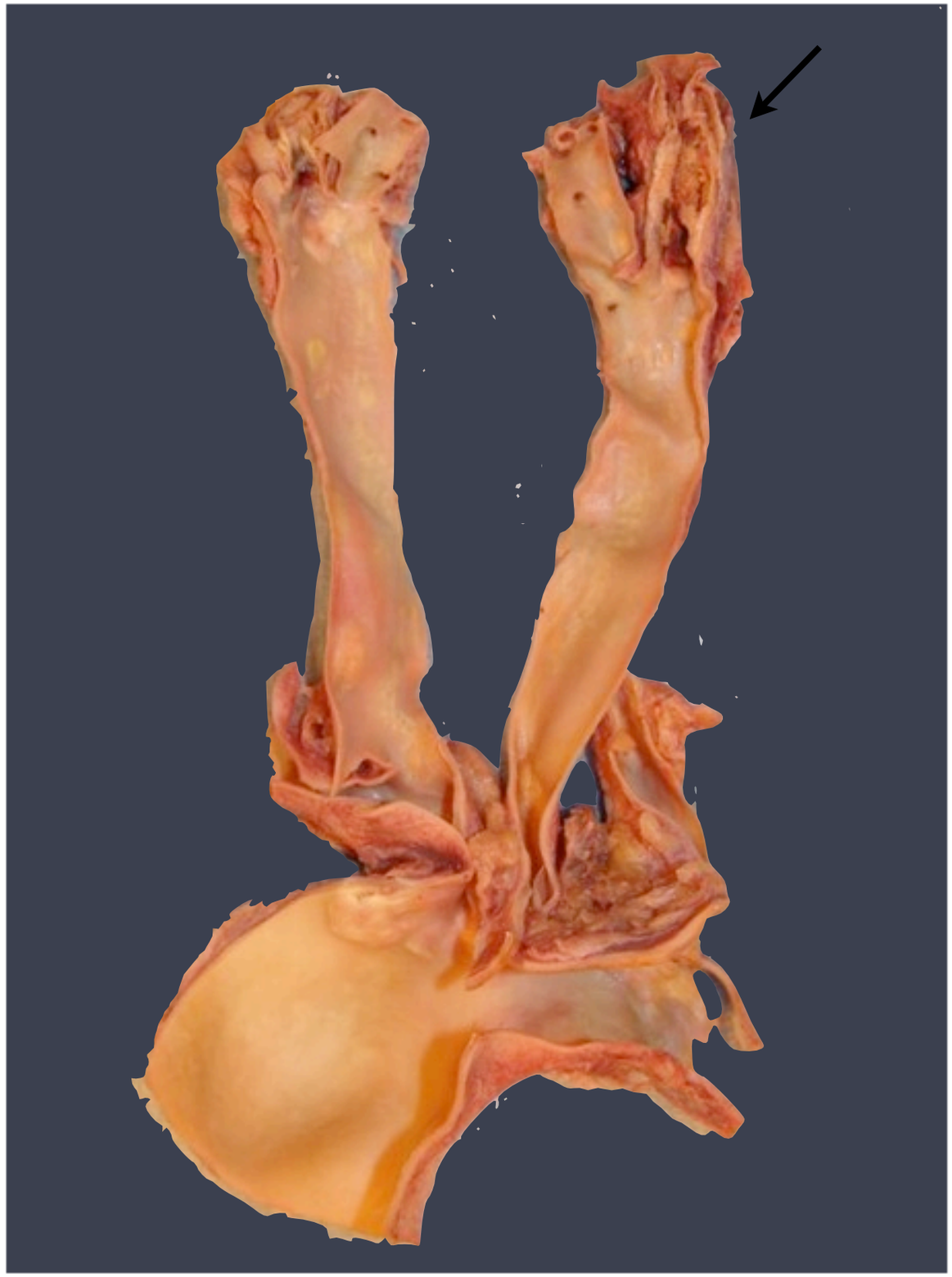


Haemorrhagic Stroke

- Clinically indistinguishable from infarction as a cause
- Diagnosed on CT scan. Much less common than infarct
- Not amenable to thrombolysis obviously
- Rarely large intracerebellar haematoma can be evacuated
- Mainstay of treatment is prevention of secondary brain injury and rehabilitation
- May need emergent CT if younger/no risk factors/reduced CT/?Δ

Cerebral Infarction

- Risk factors as above.
- Embolic from AF (-esp during cardioversion), valves, paradoxical via VSD, large left ventricular wall motion defect post MI
- Thrombotic: atherosclerosis (commonest), sludging (SSD, polycythaemia etc), dissection, arteritis
- Amenable to thrombolysis



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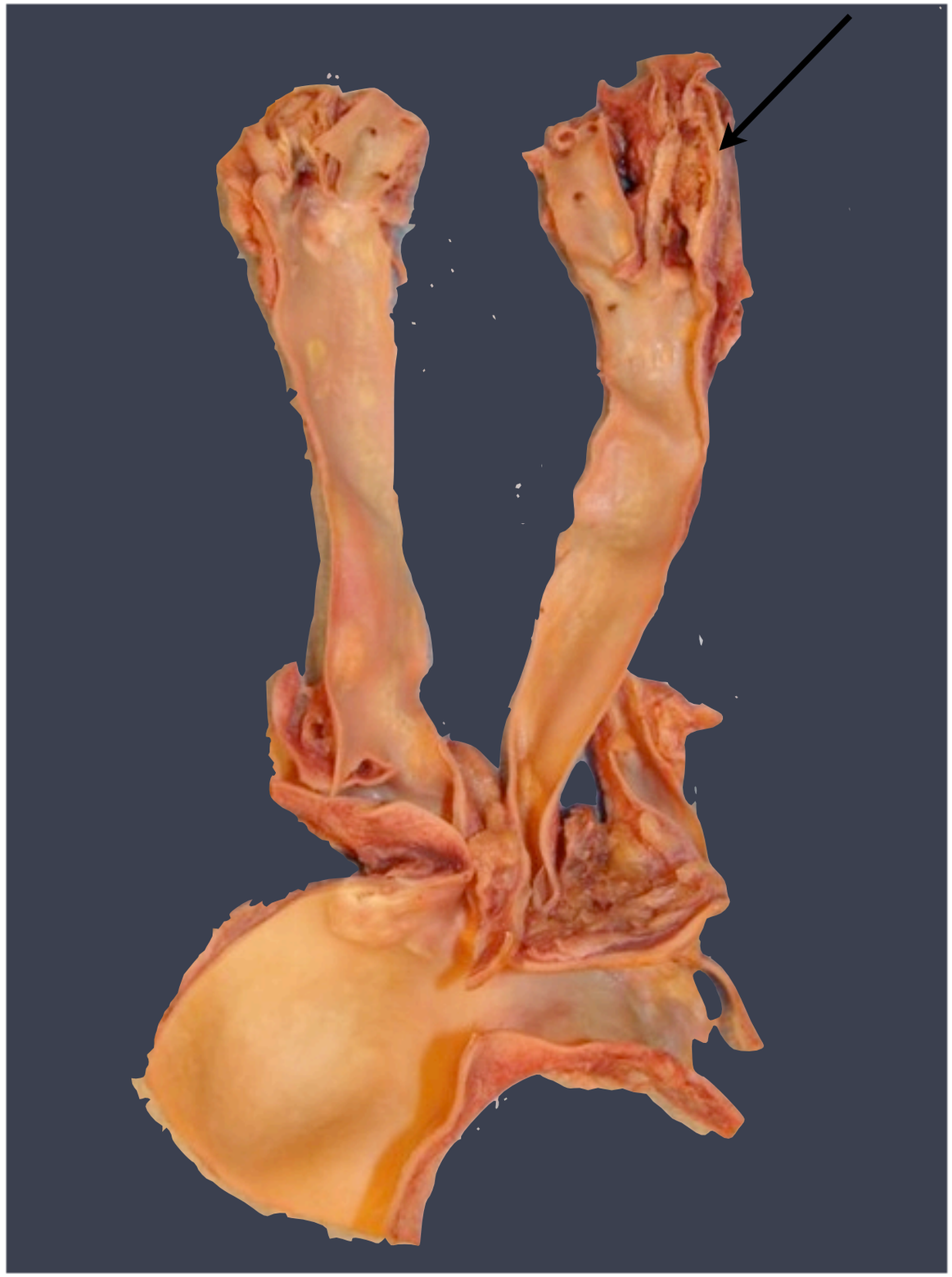


Management

- ABCD, O_2, fluids if ↓BP/ ↓GCS. Routine bloods and cholesterol, and clotting. ABG if altered ventilation. CXR for aspiration. ECG for IHD, failure etc
- Emergent CT scan if unsure about diagnosis, sig. ↓GCS, younger patients, possible SAH. In most CVA patients this will be arranged by medics, but we may see a change if thrombolysis introduced
- Early referral and transfer, preferably directly to a Stroke Unit
- NPO until swallowing assessment
- May need to consider DNR in GCS<8

Thrombolysis for CVAs?

- Strict criteria to follow or outcome is worse
- *Thrombolytic treatment with alteplase should only be given provided that:
  - it is administered within three hours of onset of stroke symptoms (unless as part of a clinical trial)
  - haemorrhage has been definitively excluded
  - the NINDS criteria have been met
  - the patient is in a centre registered with Safe Implementation of Thrombolysis in Stroke Monitoring Study (SITS-MOST)

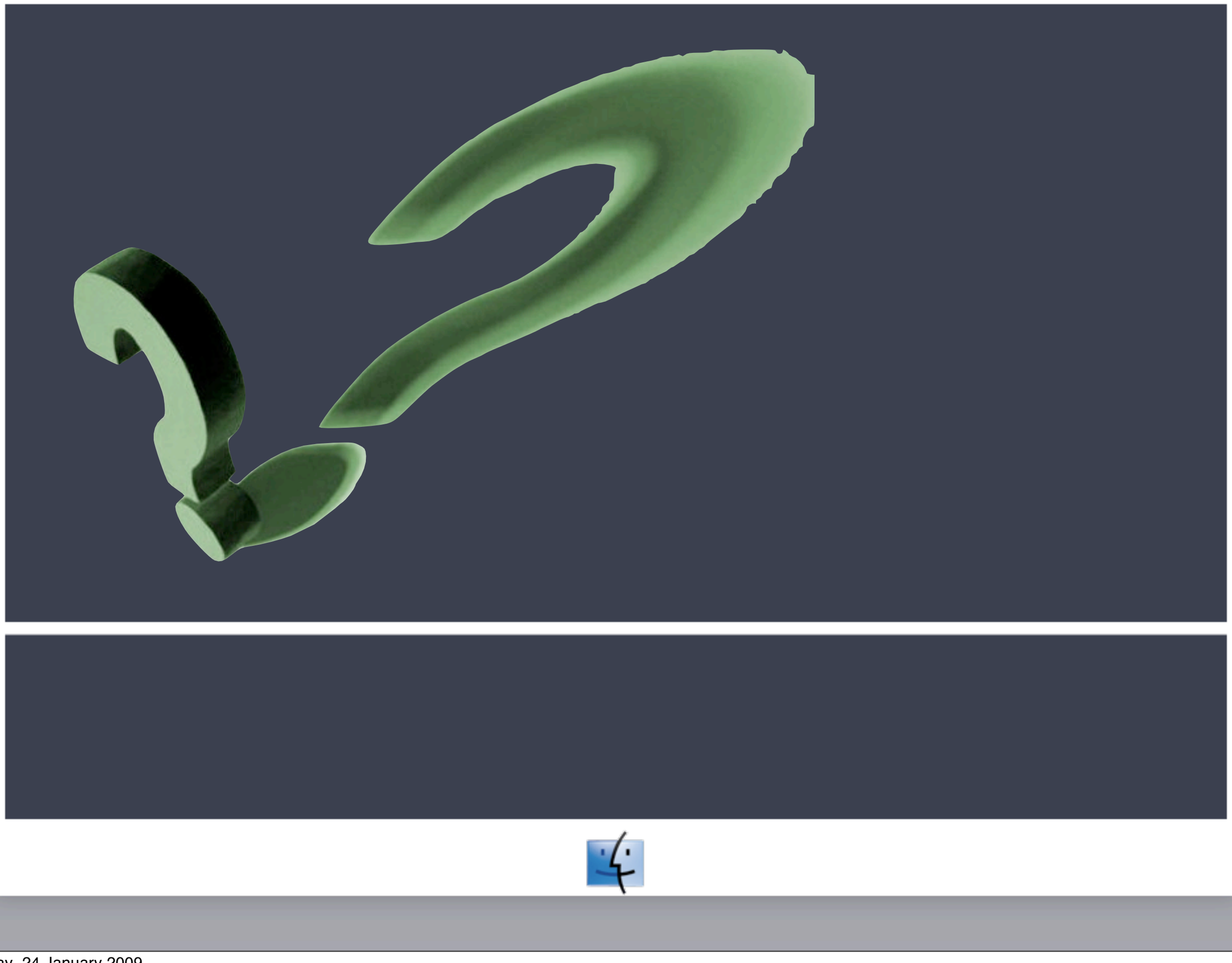
*National clinical guidelines for stroke Second edition Prepared by the Intercollegiate Stroke Working Party June 2004

TIA's

- Symptom resolution within 24 hours. Should NOT have any alteration in LOC
- Any neurology eg pronator drift/Romberg's (always check) REFER
- If full resolution, do investigations and refer TIA clinic on aspirin 300mg/d after stat
- ABCD assessment (OCSP)

Item	Score
Age	>60yrs=1
BP	>140/90=1
Clinical	Hemi=2, speech only=1, nil=0
Duration	>60min=2, 10-59mins=1, <10mins=0

7 day CVA risk: 4=1%, 5=12%, 6-31, REFER if ≧5 or if multiple recent TIA's



Summary

- Common condition
- Try and work out where the CVA is if possible
- Early maintenance with oxygen, fluids and referral
- Early CT and thrombolysis MAY be on the way
- TIAs will need admission if they are high risk or any residual neurology on arrival