

# Brain anatomy & physiology and Neurological Assessment

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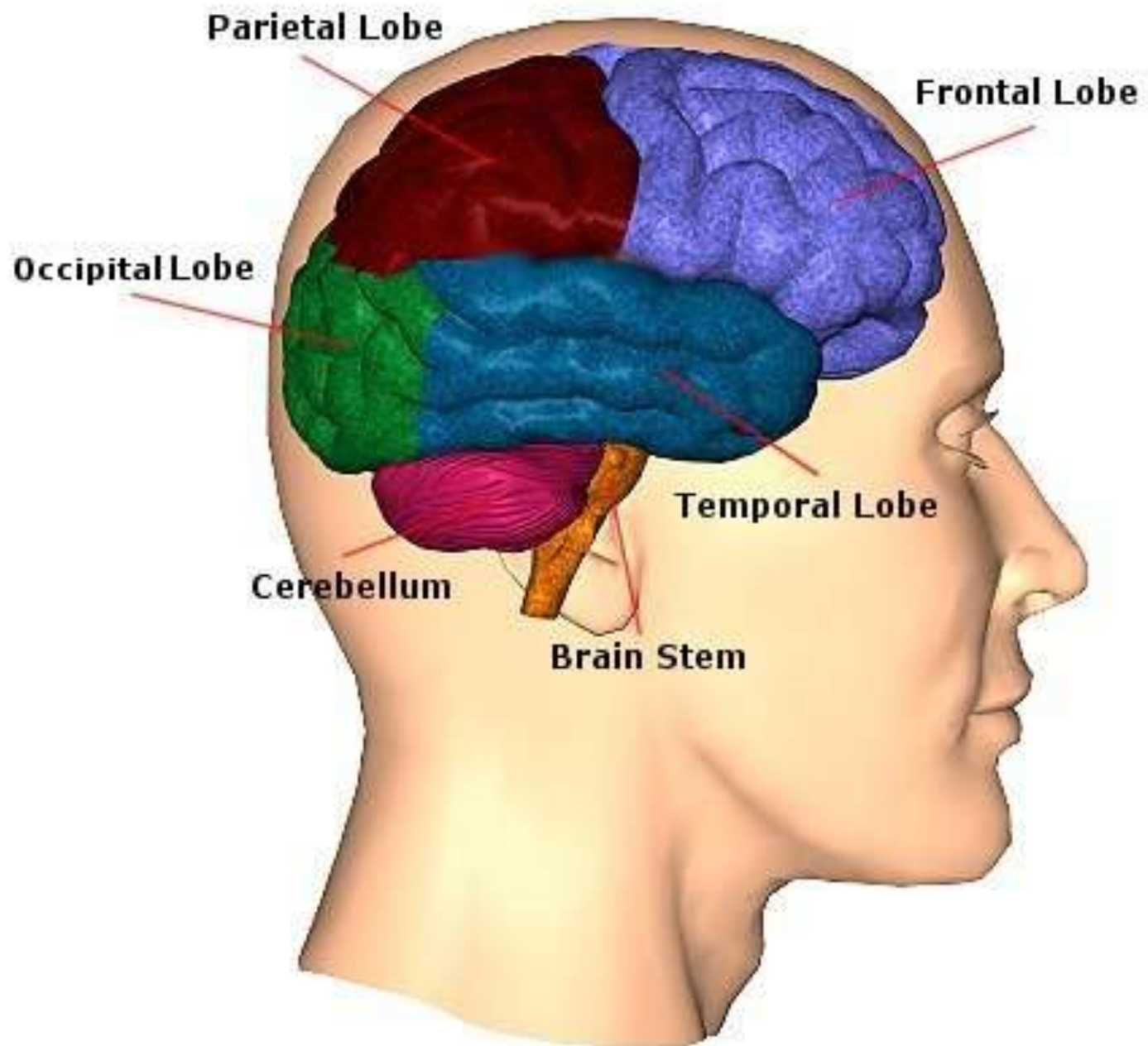
(Practice Development Nurse, GSTT)

# What is a stroke?

- interruption of the blood supply to the brain, caused by a blocked or burst blood vessel...cuts off the supply of oxygen and nutrients, causing damage to the brain tissue. (World Health Organisation 2010)

# Aetiology of Stroke

- Cerebral infarction/ischaemic 81%
  - Intracerebral haemorrhage 13%
  - Subarachnoid haemorrhage 6%
  - Risk of recurrence within 5 years 30-40%
- (Stroke Association 2010)

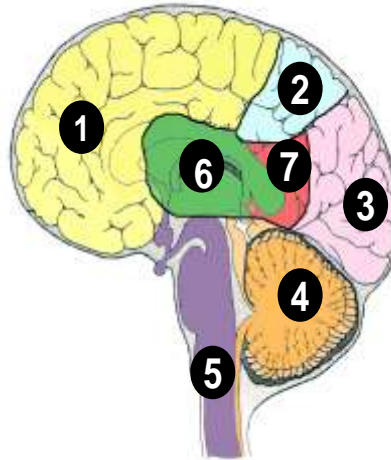


### 1. Frontal Lobe

Controls:

- Behaviour
- Emotions
- Organisation
- Personality
- Planning
- Problem solving

Arteries: ACA, MCA



### 2. Parietal Lobe

Controls:

- Judgement of shape, size, texture, and weight
- The sensation of pressure and touch
- Understanding of spoken/written language

Arteries: ACA, MCA



### 3. Occipital Lobe

Controls:

- Colour recognition
- Shape recognition

Arteries:  
PCA

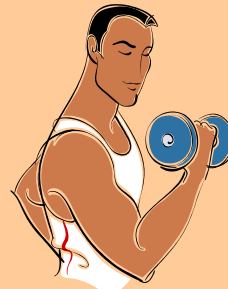


### 4. Cerebellum

Controls:

- Balance
- Muscle co-ordination
- Posture maintenance

Arteries: Basilar  
PICA, AICA, SCA



ACA = Anterior Cerebral Artery  
MCA = Middle Cerebral Artery  
PCA = Posterior Cerebral Artery  
PICA = Posterior Inferior Cerebellar Artery  
AICA = Anterior Inferior Cerebellar Artery  
SCA = Superior Cerebellar Artery

### 5. Brainstem

Controls:

- Alertness
- Blood pressure
- Digestion
- Breathing
- Heart rate

Arteries: Vertebral Basilar



### 6. Hippocampus

Controls:

- Object recognition
- Stores meaning words or place

Arteries: PCA



### 7. Temporal lobe

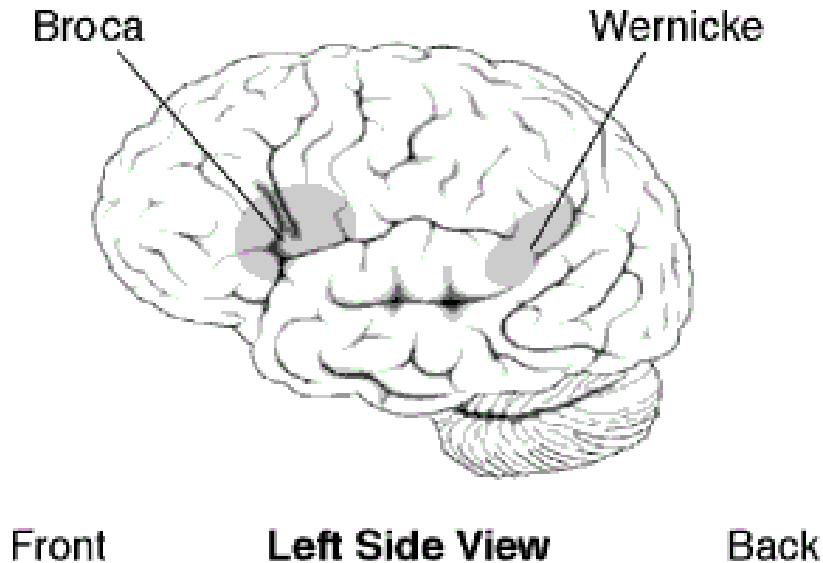
Controls:

- Smell Identification
- Sound Identification
- Short-term Memory
- Hearing

Arteries: MCA, PCA

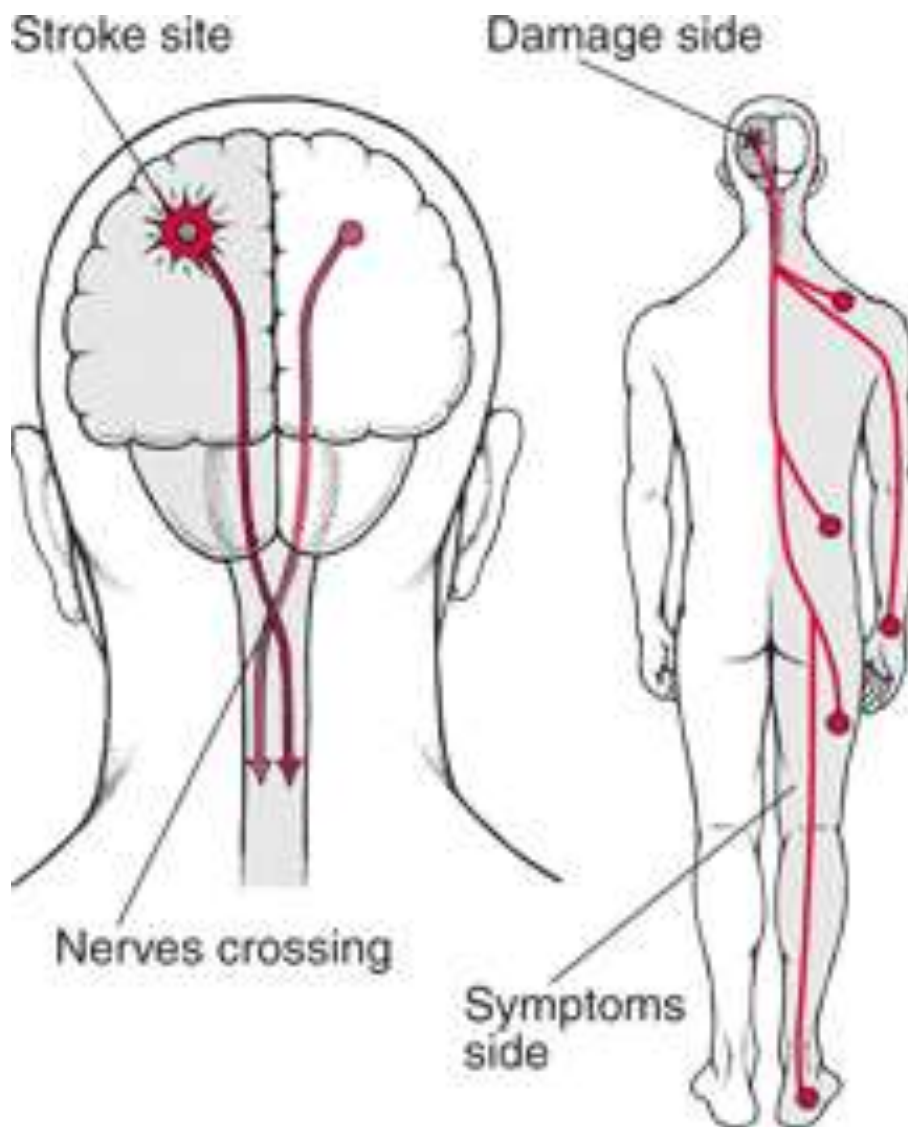


# Speech centres

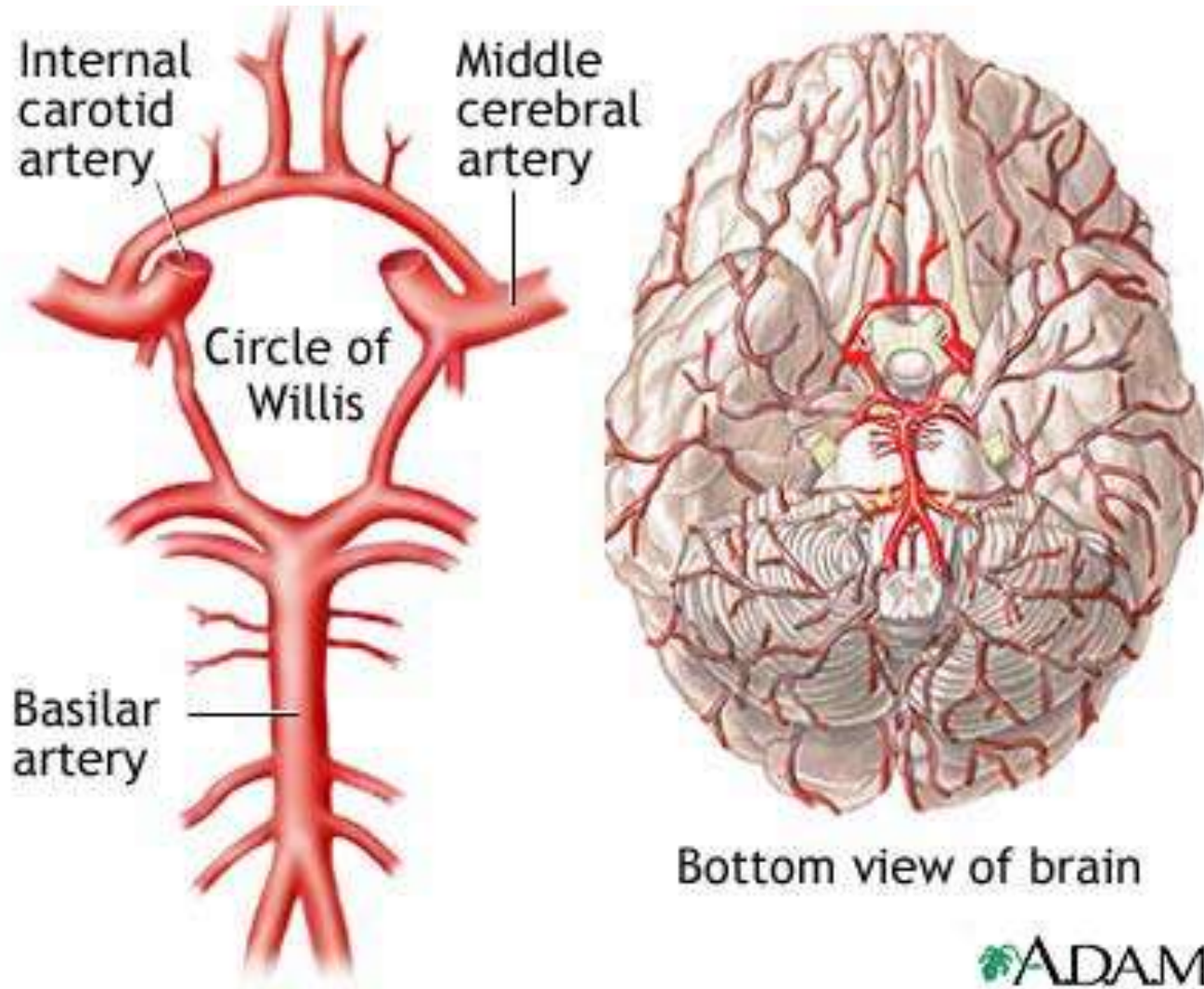


- **Broca**; control the muscles of the larynx, pharynx and mouth that enable us to speak
- **Wernicke's area**, injury here may result in receptive dysphasia.

# Contra-lateral Control

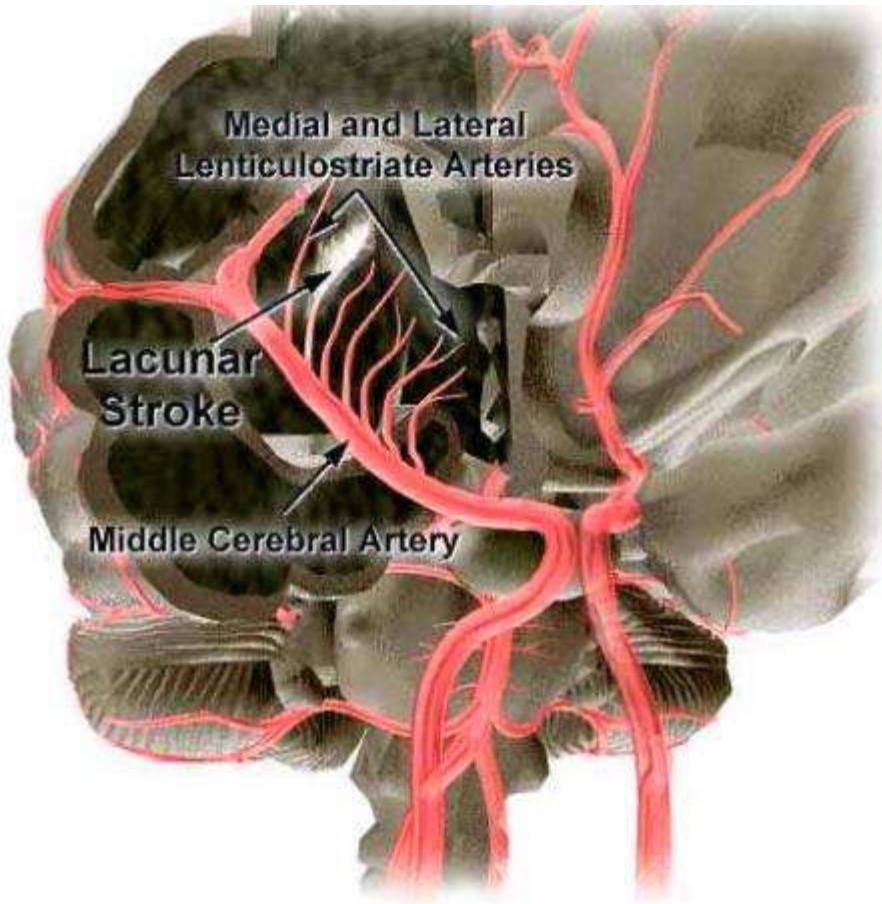


# Blood Supply to the Brain

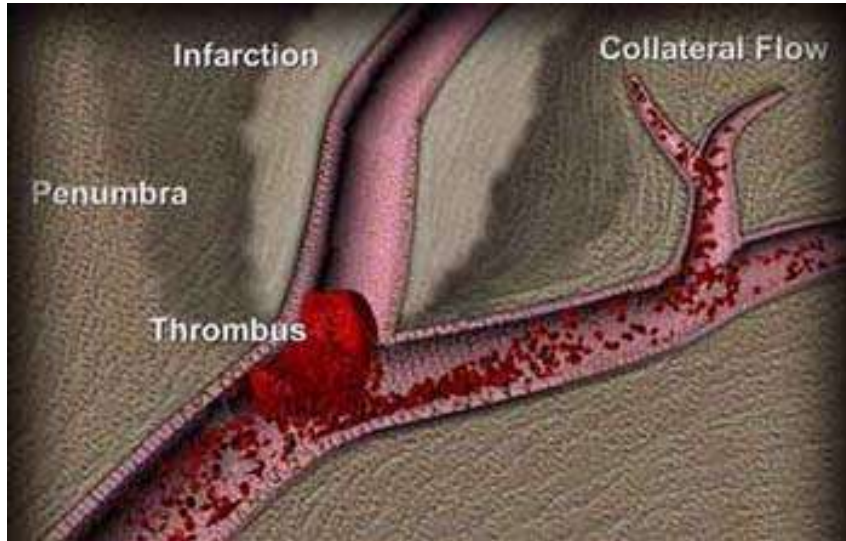




# Lacunar Stroke



# Ischemic stroke (Thrombo/embolic stroke)



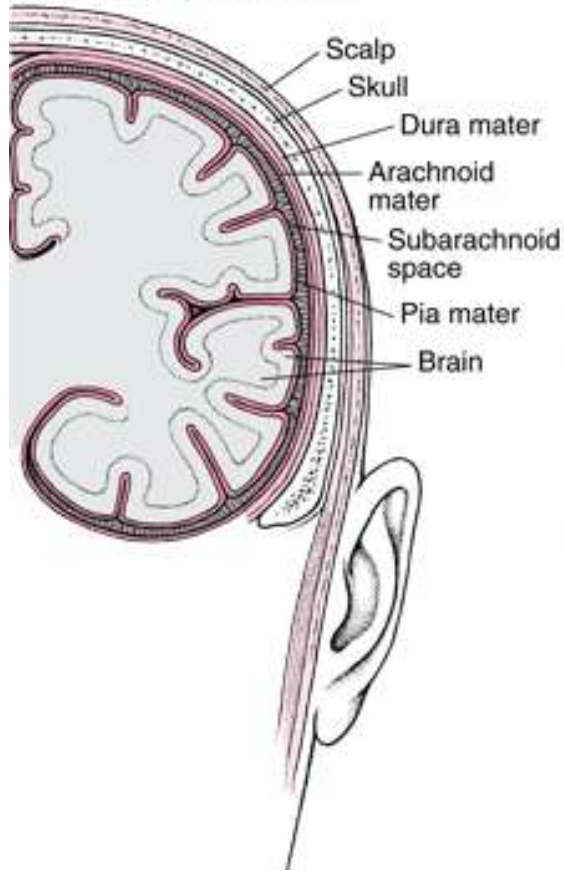
- hypercholesterolemia
- hypertension
- Atrial fibrillation
- Ischaemic heart disease/angina
- Peripheral vascular disease
- Diabetes



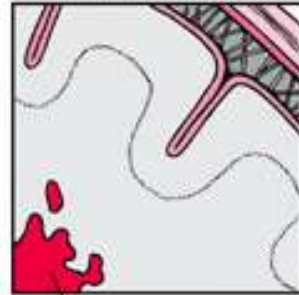
- Previous stroke/TIA
- Smoking
- Increased alcohol intake
- Poor diet/obesity
- Increased age-atherosclerosis
- Oral Contraceptive Pill
- Drug misuse

# Haemorrhagic Stroke

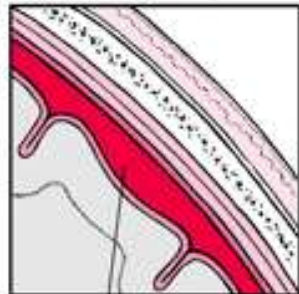
Cross Section of the Brain



Intracerebral Hemorrhage



Subarachnoid Hemorrhage



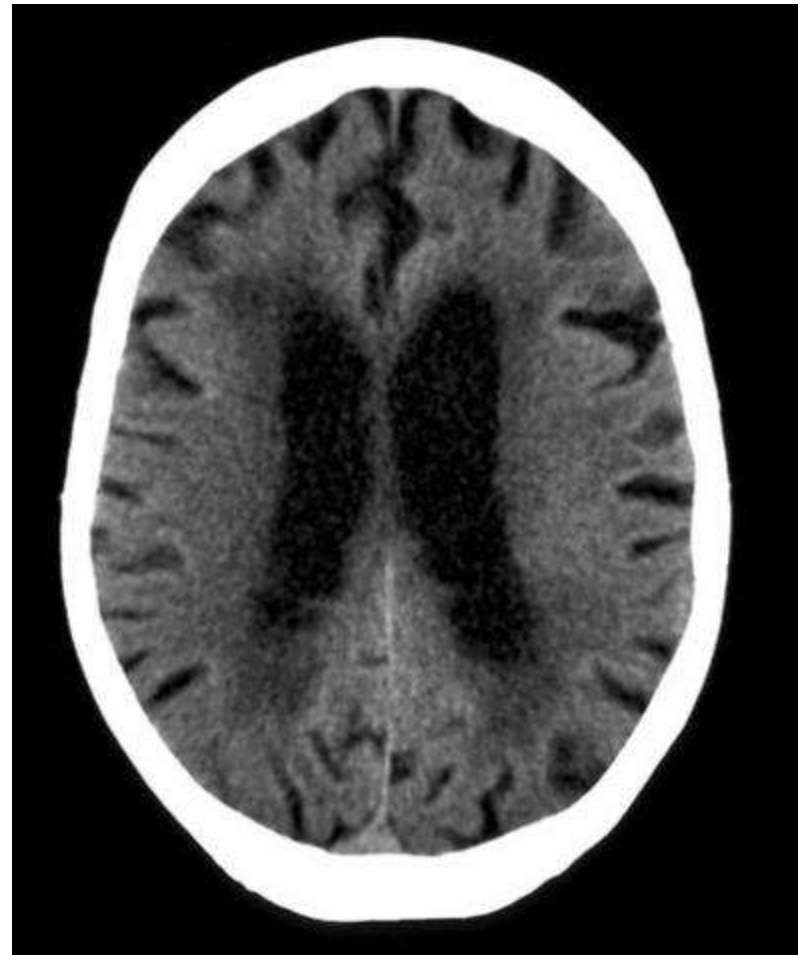
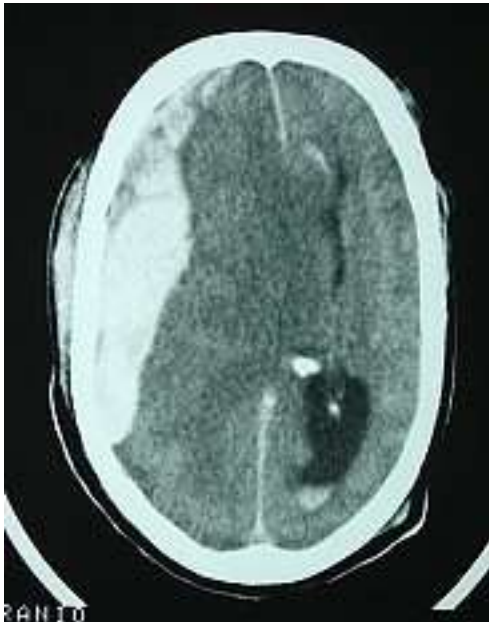
- Chronic high blood pressure.
- Amphetamine.
- Amyloid angiopathy
- Arterial Venous malformation (AVM),
- inflammation of blood vessels (vasculitis),
- bleeding disorders,
- anticoagulants,

# Intracerebral and subarachnoid haemorrhage





# Subdural haemorrhage and small vessel disease



# Raised Intracranial Pressure

## Early Signs

- Agitation
- Vomiting
- Headache
- Dilated pupils

## Later Signs

- Increased systolic blood pressure
- Bradicardia
- Abnormal respiratory pattern

# Causes and Treatment

## Causes

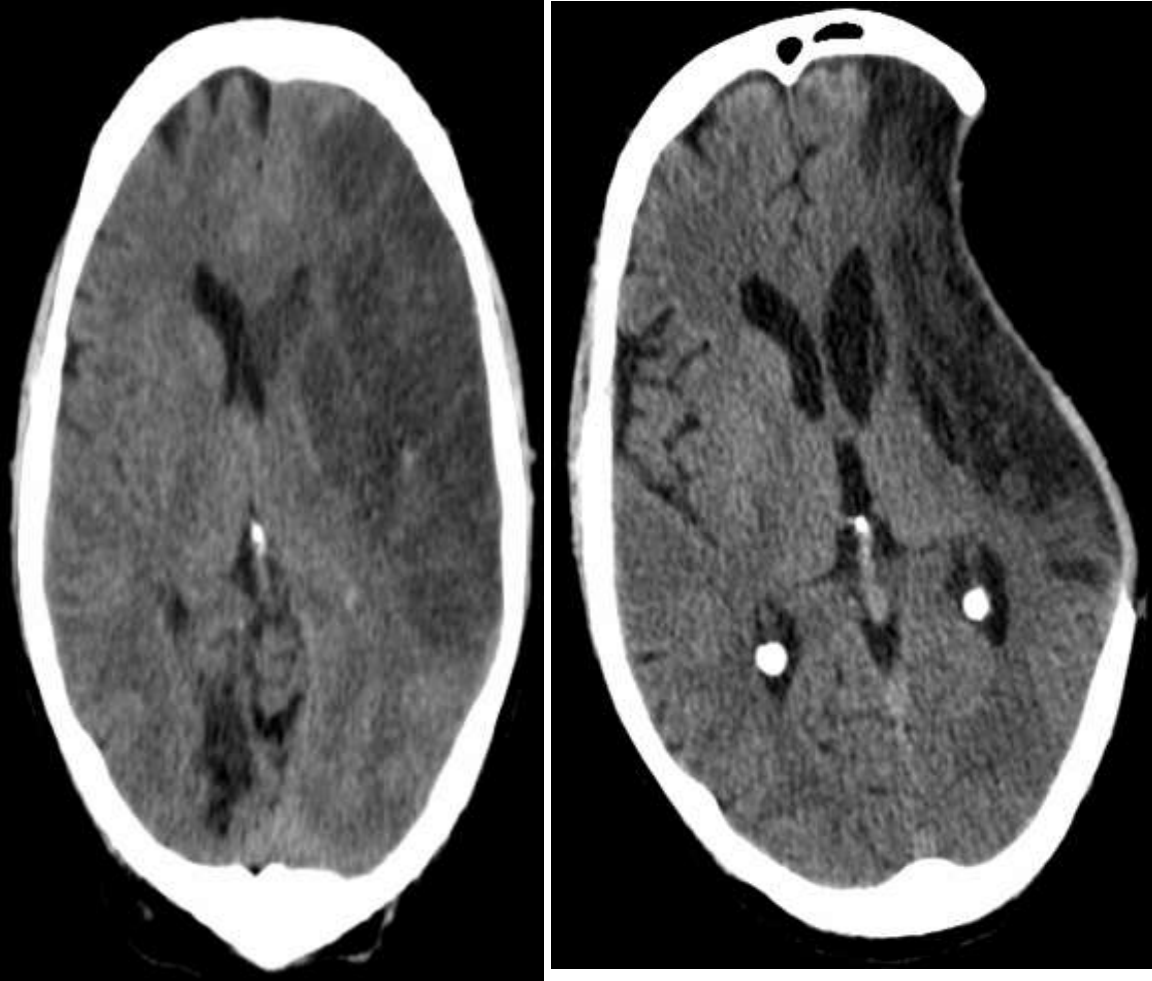
- Oedema
- Haemorrhage
- Tumour
- Encephalopathy

## Treatment

- Steroids
- Mannitol
- Hyperventilation
- Hemispherectomy



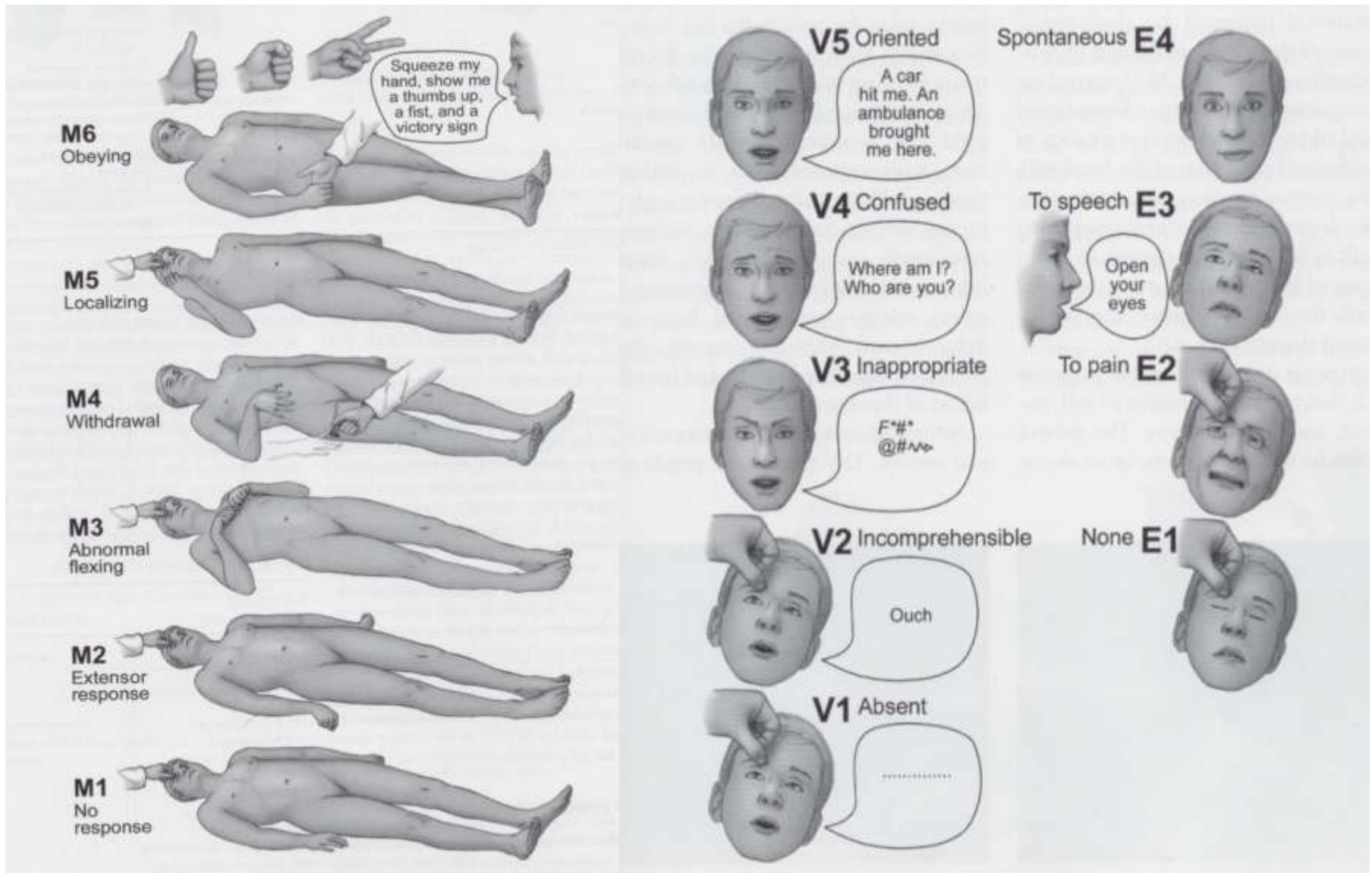
# Hemicraniectomy



# Neurological Assessment

- **AVPU – what does this mean?**
- **Blood sugar**
- **Pupils**
- Then move onto GCS and full neuro assessment

# Illustration of GCS



# The Glasgow Coma Scale

- The eye opening category is performed once the patient is fully awake not before
- The verbal category means a verbal response – the patient has to verbally indicate their orientation to time, place and person to be orientated
- Mute dysphasic patients cannot score 5 on the verbal category

# The Glasgow Coma Scale

- The motor response is best done without the patient copying your action – truly obeying command not copying!
- Score the GCS in your documentation as  
GCS=15 E 4 V 5 M6

# MRC limb power grading

- 5= full strength
- 4=able to move against resistance but easily overcome
- 3= able to move against gravity but not resistance
- 2= able to move but not against gravity
- 1= flicker
- 0= no movement

# Neurological assessment

- Score the patient as you see them – no guessing or backdating the results
- If they do not meet one criteria move down the score to the next one
- Always start the assessment with the patient as awake as possible (even at 2am)

# Changing GCS

- If patient looks different to the GCS scoring do a set of obs together at hand over
- Consistency with using the neuro. Obs is vital to detecting changes in the patients
- Don't forget to spot other changes like increasing confusion even if the GCS hasn't yet changed



# Patterns of change in GCS

- Dropping obviously!
- Fluctuating widely – could it represent seizure (sub-clinically)
- Increasing difficulty in obtaining the same GCS
- Small changes within the category – e.g. confused but worsening confusion, obeys some commands but not others
- Vital signs changes- will come to later

# ESCALATE!!!!

If you are concerned at all, do not be afraid to  
escalate!!!!

- Band 6
- Site Nurse Practitioner
- Consultant oncall