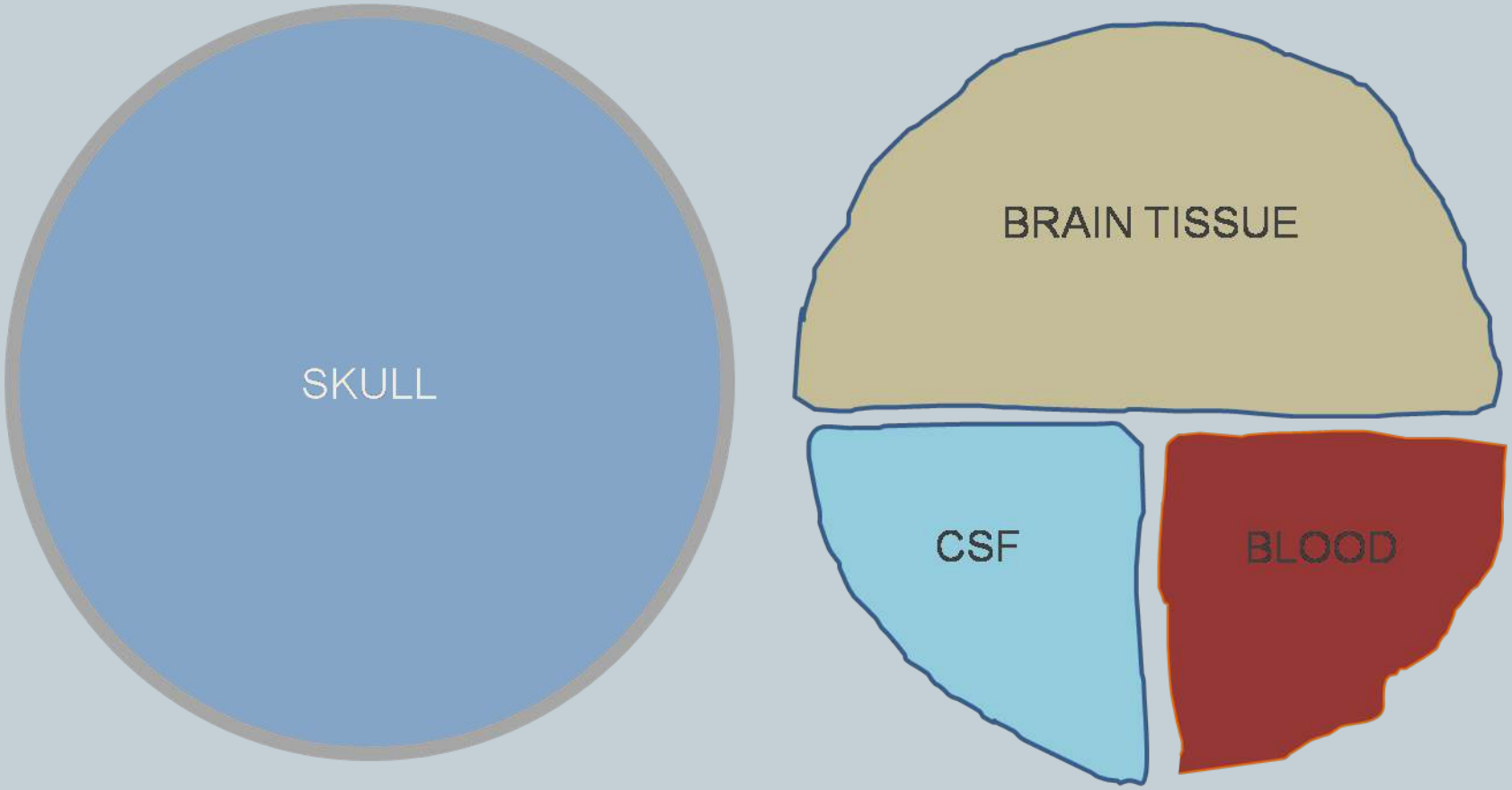
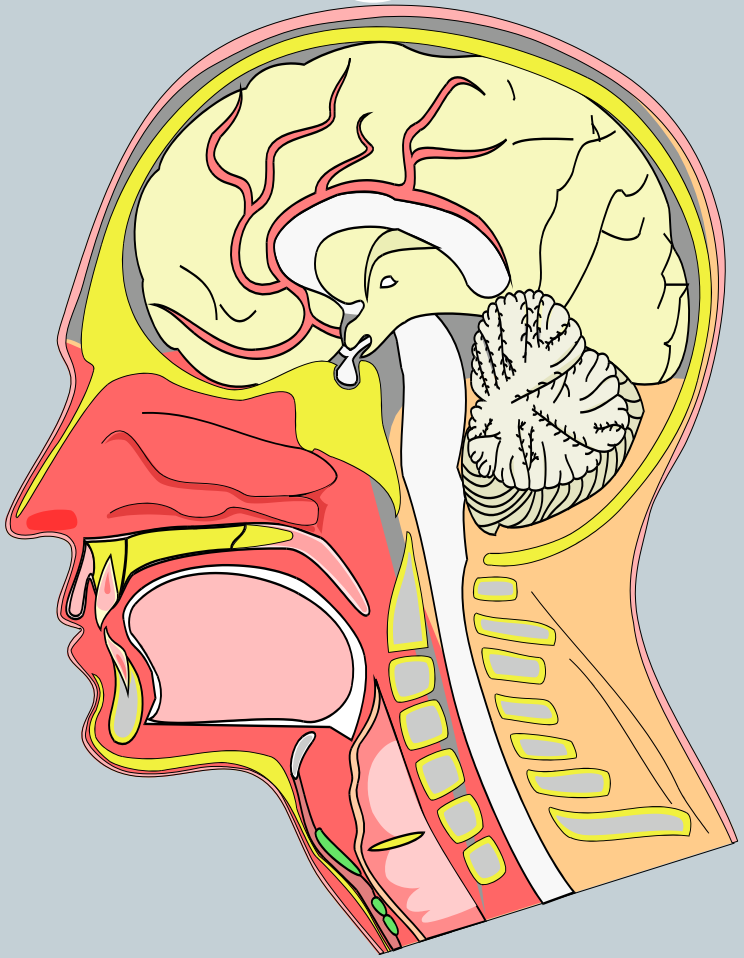
# Management of Subarachnoid Haemorrhage (SAH) Patients

# Learning Outcomes

- Awareness of incidence and aetiology of SAH
- Appreciation of goals for care management
- Understand the components of secondary injury
- Know common complications to look out for
- Know what nursing and medical interventions are employed to prevent elevated ICP and other secondary injuries/complications.

# Monro- Kellie Hypothesis





# Putting SAH in Perspective

- SAH is a form of “stroke” and comprises around 7% of all strokes
- Incidence is around 9 per 100,000 per annum
- Up to 50% of all SAH are fatal, with 10 to 15% of patients dying before they reach hospital and a further 35-40% dying in hospital
- Approx 200-400 admissions to ICU per year in NHS Lothian

# SUBARACHNOID HAEMORRHAGE

- Bleeding into the subarachnoid space (e.g. aneurysm or trauma)
- Risk of aneurysmal SAH  increases with middle age and the elderly
- Smoking/excessive alcohol/ untreated hypertension
- Risk is 25% higher in women (? Hormonal changes)
- Genetics (3 to 5 fold î risk in 1st degree relatives)

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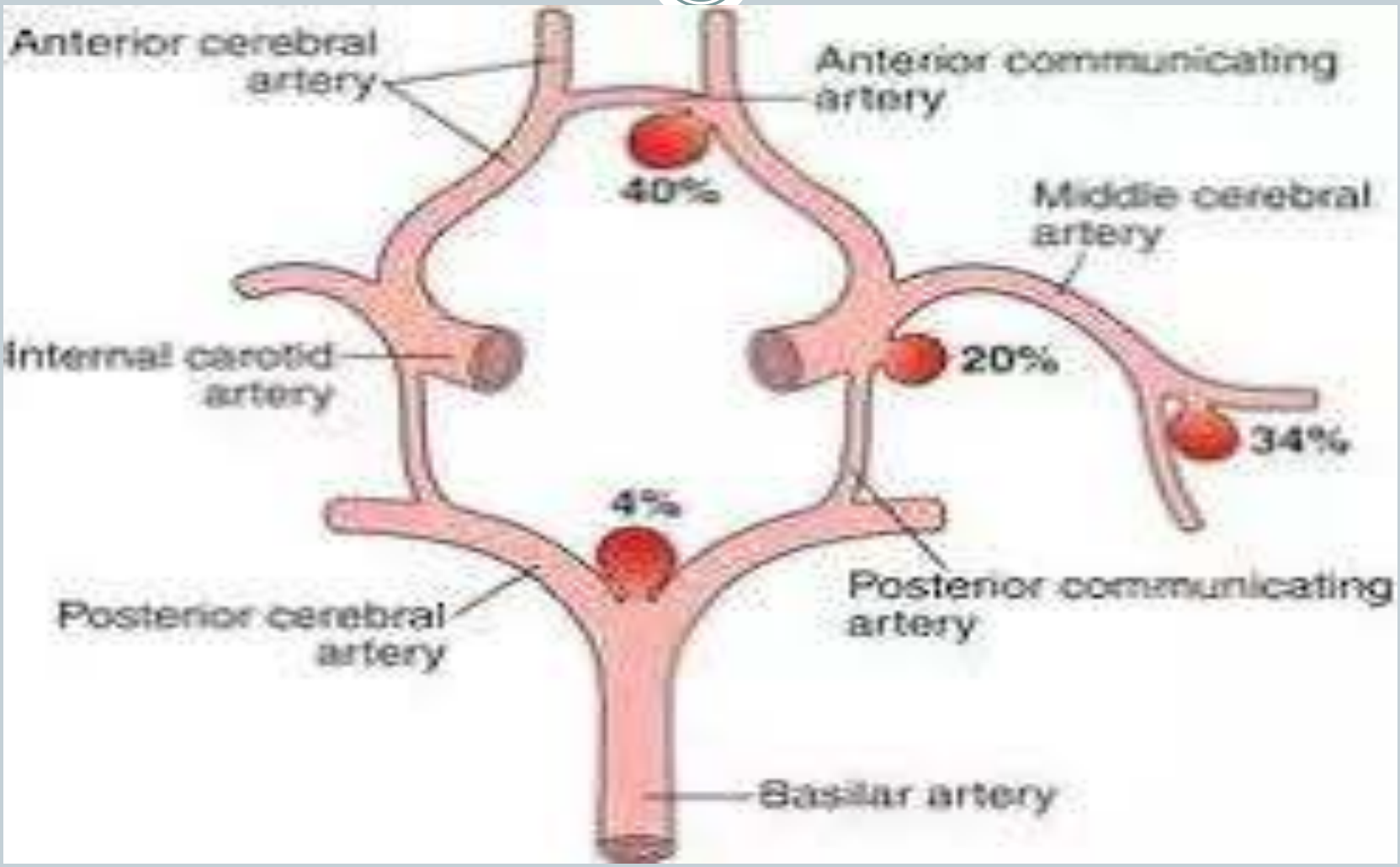
# Common Sites



# Symptoms/ Presentation

- ‘Thunderclap Headache’
- Nausea Vomiting
- Some patients experience ‘sentinel symptoms’ indicating leak before collapse
- collapse

# Grading SAH

## Hunt and Hess Classification of subarachnoid hemorrhage

Grade 1: Asymptomatic, mild headache, slight nuchal rigidity

Grade 2: Moderate to severe headache, nuchal rigidity , no neurologic deficit other than cranial nerve palsy

Grade 3: Drowsiness / confusion, mild focal neurologic deficit

Grade 4: Stupor, moderate-severe hemiparesis

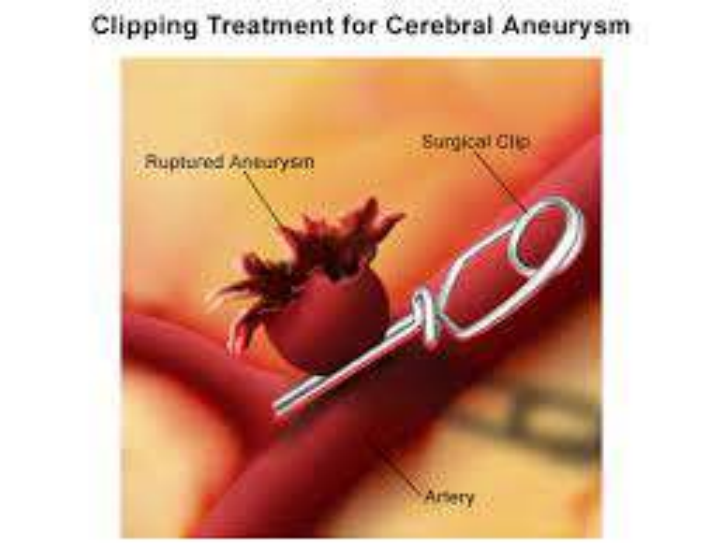
Grade 5: Coma, decerebrate posturing

Tufts Comprehensive Stroke Center at NEMC



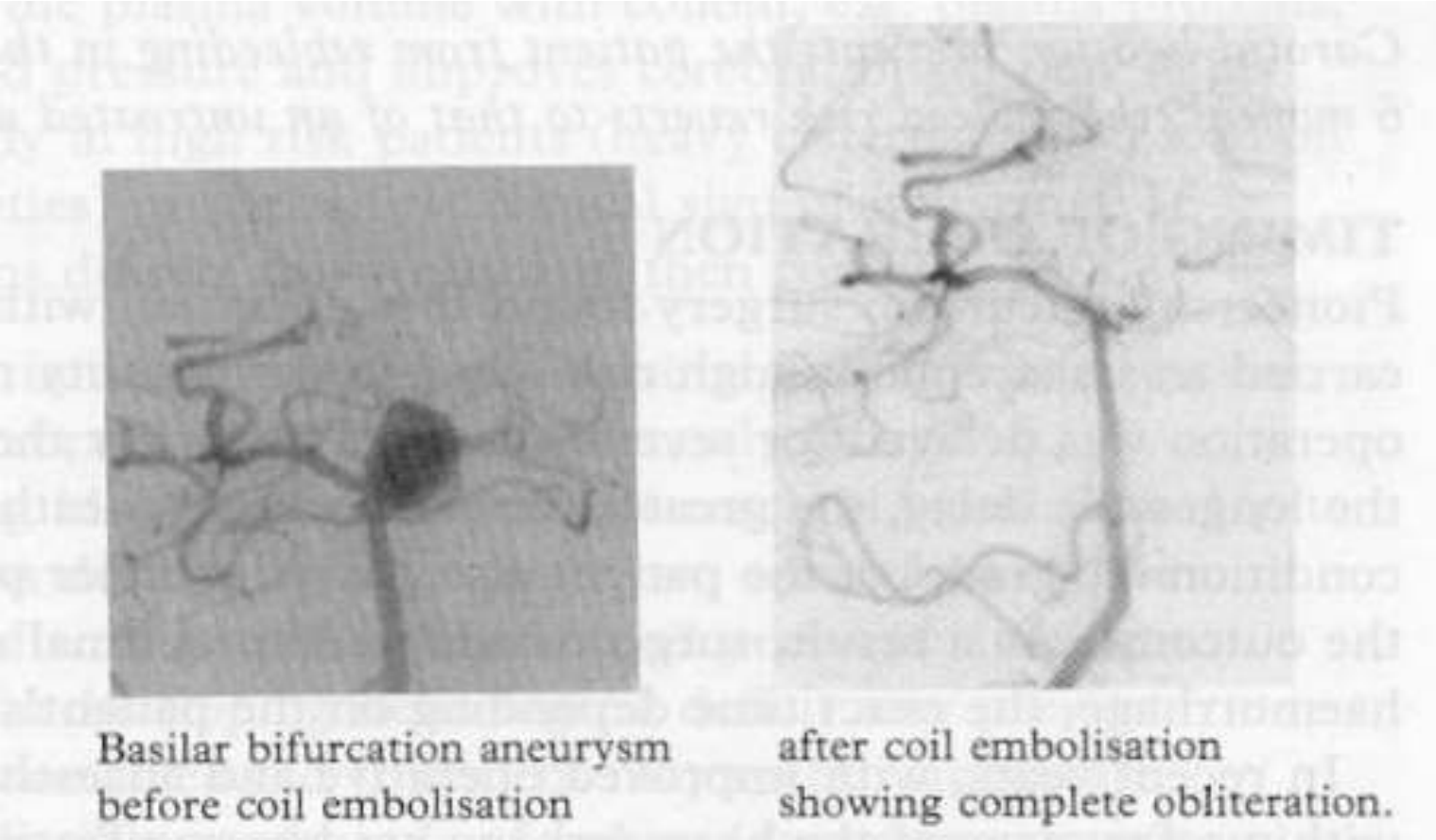
Sedation hold within first 12 hours

# Treatment


Clipping Treatment for Cerebral Aneurysm
Ruptured Aneurysm
Surgical Clip
Artery


neck
coils
aneurysm
dome
© Mayfield Clinic

# Sub Arachnoid Haemorrhage



Basilar bifurcation aneurysm before coil embolisation

after coil embolisation showing complete obliteration.

# Nursing Care

- As per protocol
- Head up
- Tape rather than tape
- PO2 > 12
- PCO2 5-6
- SBP 120-160 uncoiled
- SBP >140
- Careful Fluid and Electrolyte balance
- Nimodipine
- Temperature control
- Scan if drop in GCS
- Phenytoin if seizure at the time of th aneurysm

# Secondary Brain Injury/ Complications

- Decreased Cerebral Perfusion /blood flow (Hypotension, Intracranial Hypertension)
- Decreased Oxygen Supply (Hypoxia, Anaemia)
- Seizure
- Rebleed
- Delayed cerebra ischemia – caused by cerebal vasopasm.
- Hydrochephalus
- Neurogenic Pulmonary Oedema
- Myocardial

# Cerebral Vasospasm

- *Cerebral vasospasm* is the prolonged, intense vasoconstriction of the larger conducting arteries in the subarachnoid space which is initially surrounded by a clot. Significant narrowing develops gradually over the first few days after the aneurysmal rupture

- Nimodipine has shown to be effective at prevention 60mg  4hrly
- Hypertension- if aneurysm secured (otherwise SBP 120-160)

- Worse 48hrs-10 days
- Causes significant secondary complications

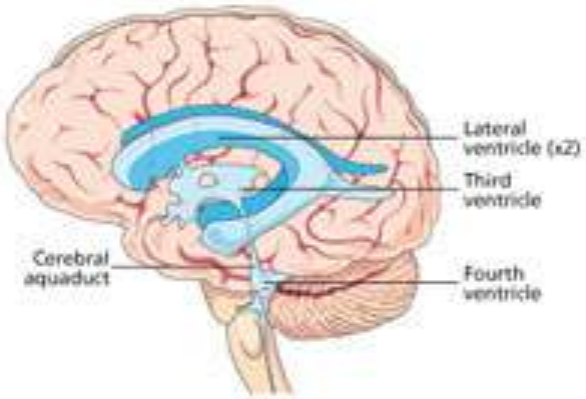
# SECONDARY INJURIES; THE CULPRITS!

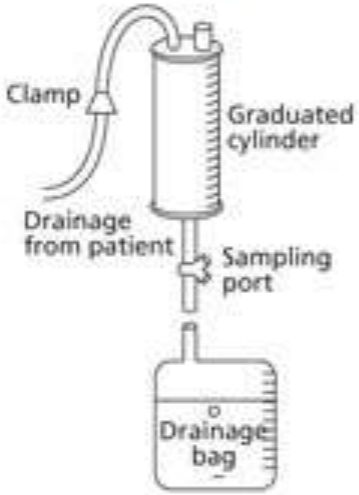
## The Eight H'S;

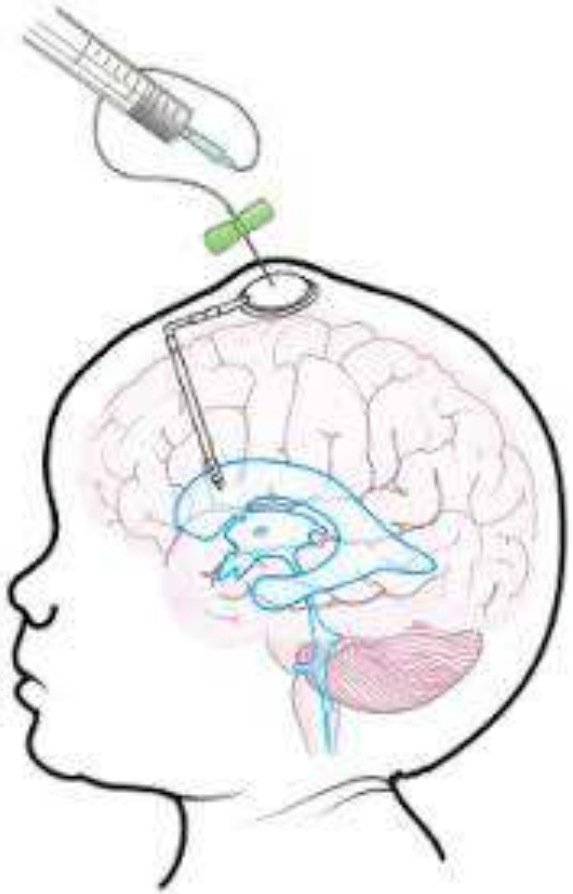
1. Hypoxia
2. Hypertension (Intracranial)
3. Hypotension
4. Hypo/ Hypercapnia
5. Hyponatraemia
6. Hypoglycaemia
7. Hyperpyrexia
8. Haematoma

# Hydrocephalus

# External Ventricular Drain



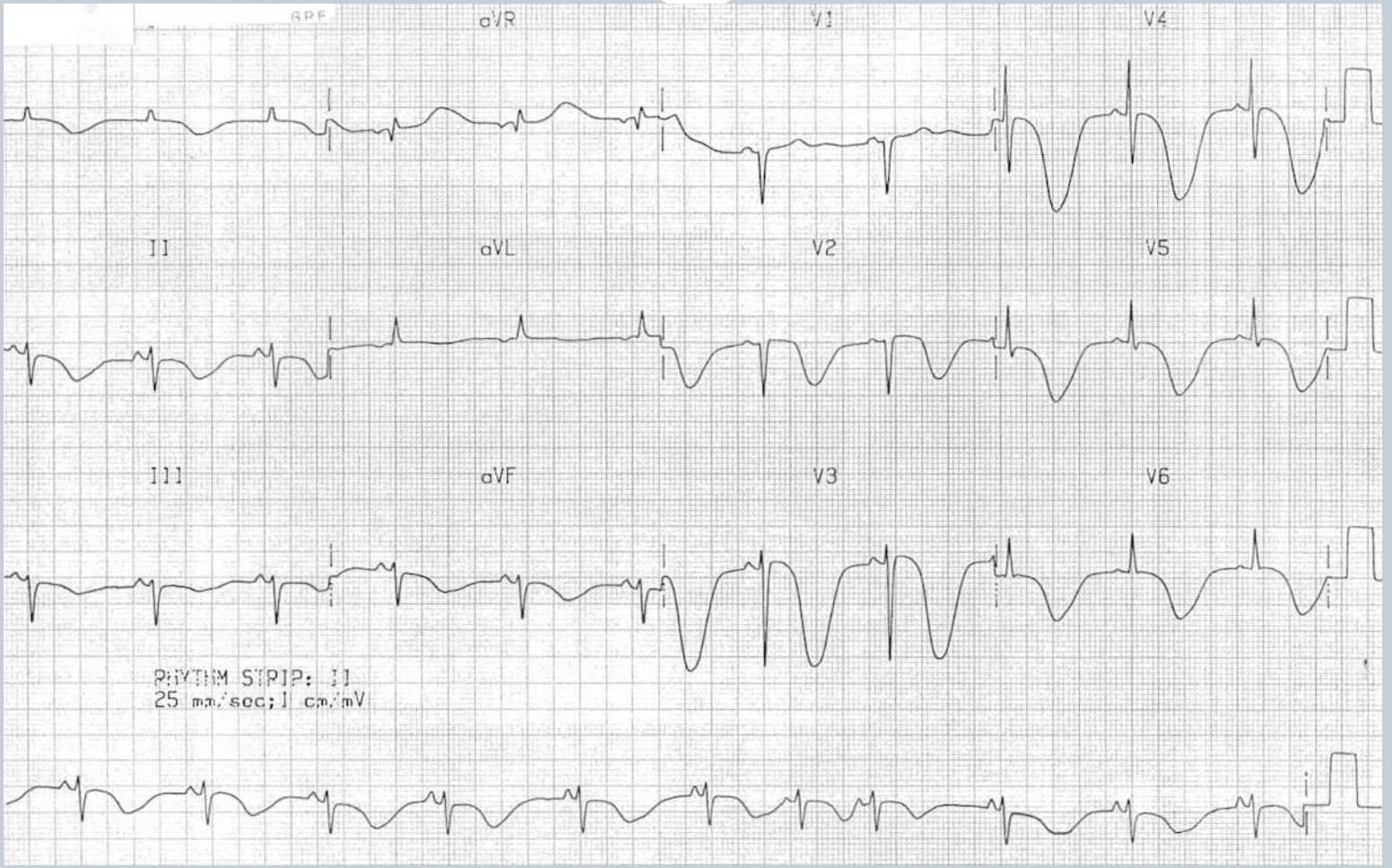



# Therapeutic Goals

- $SpO_2$ > 95%
- BP/MAP > 90mmHg
- Unsecured SAH- SBP 120-160mmHg Secured 140-200mmHg (vasospasm)
- PaO2, > 12kPa
- PaCO2 4.5-5kPa
- Normothermia
- Hgb >90g/l
- Glucose 4.5-10mmol/l

# Abnormal ECGs



# MEASURES TO REDUCE ICP

Consistently high ICP

RESCAN EARLY

- To exclude surgically remedial causes
- Decompressive hemi-craniectomy or bifrontal craniectomy (Stage 3 therapy)

# Complications of SAH

- Cerebral Oedema/Swelling
- Hydrocephalus
- Neurogenic Pulmonary Oedema
- Disorders of Salt/Water Balance
- Seizures
- Vasospasm (ischemia)
- Rebleeding (aneurysm)
- ECG Changes
- VAP

- DVT (/Pneumatic Compression.  Heparin later-once coiled and confirmed with neurosurgeons)
- Stress Ulceration prophylaxis
- Bowels

# BRAIN STEM HERNIATION

- Continued ICP rise
- Cushings' reflex (widening of pulse pressure)
- CPP falls
- ICP so high that brain herniates
- BP falls
- Pupils fixed and dilated
- Brain-stem death tests

# CARE OF THE FAMILY

- Empathetic
- Flexible regarding visiting
- Involve in care

# PROGNOSTIC INDICATORS

- CAT SCAN
- GCS
- AGE
- PUPIL RESPONSE
- HAEMODYNAMICS

# References


- The Guidelines for the Management of Severe Traumatic Brain Injury (Brain Trauma Foundation, 3rd Edition 2007)
- Scottish Intercollegiate Guidelines Network May 2009
- http://www.sign.ac.uk/guidelines/fulltext/110/index.html