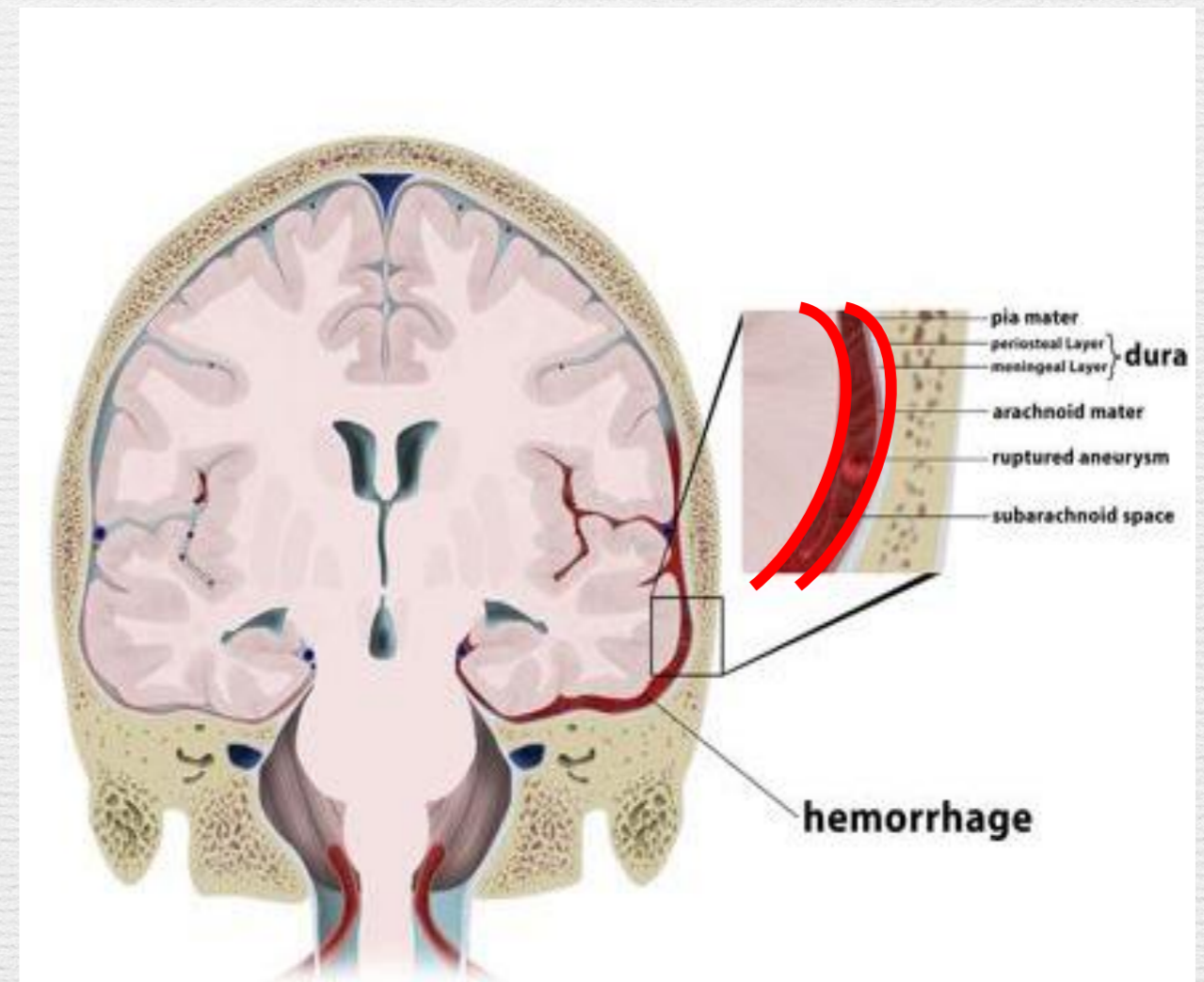


# Subarachnoid Haemorrhage

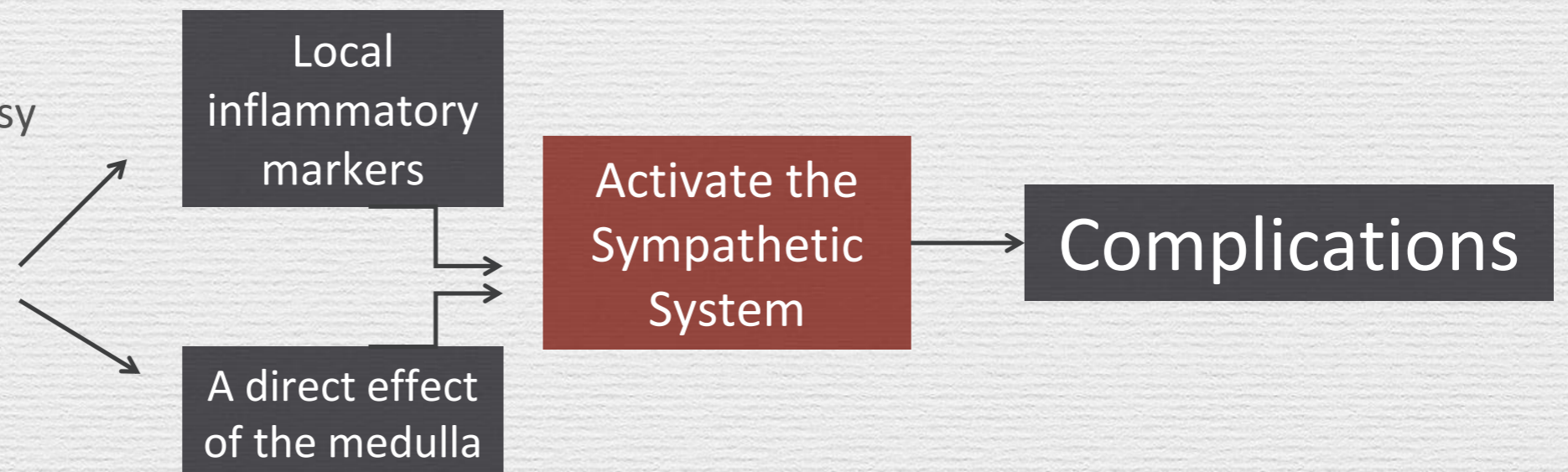
# Definition

Sub arachnoid hemorrhage, a medical emergency, is a type of stroke that is characterized by a sudden bleeding into the subarachnoid space which may lead to permanent brain damage or death if not treated promptly.



# Symptoms

- Thunder clap headache that develops over seconds to minutes
- Vomiting
- Confusion
- Decreased level of consciousness
- Signs of meningism like neck stiffness and photophobia
- Signs of rising Intracranial pressure
- Terson Syndrome
- Oculomotor Nerve Palsy
- Seizures
- Sympathetic Surge



# Types

- Traumatic
- Spontaneous:
  - Aneurysmal
  - Non-aneurysmal

# Traumatic SAH

- Convexity of the cerebral hemispheres
- Presence of contusions and Sub Dural Hemorrhage
- 30%-40% of severe traumatic brain injury



# Types

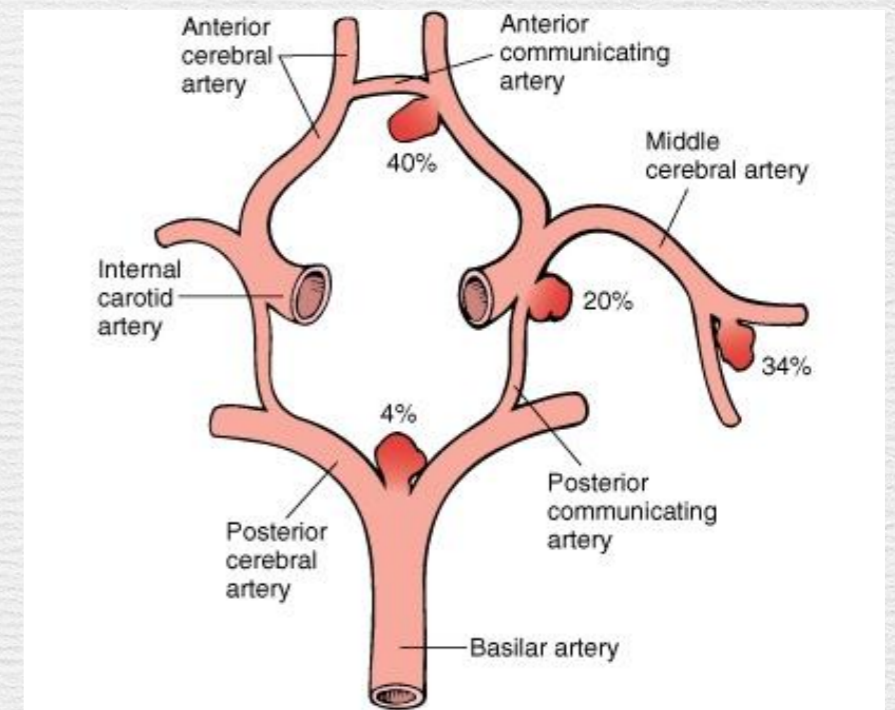
- Traumatic
- Spontaneous:

- Aneurysmal

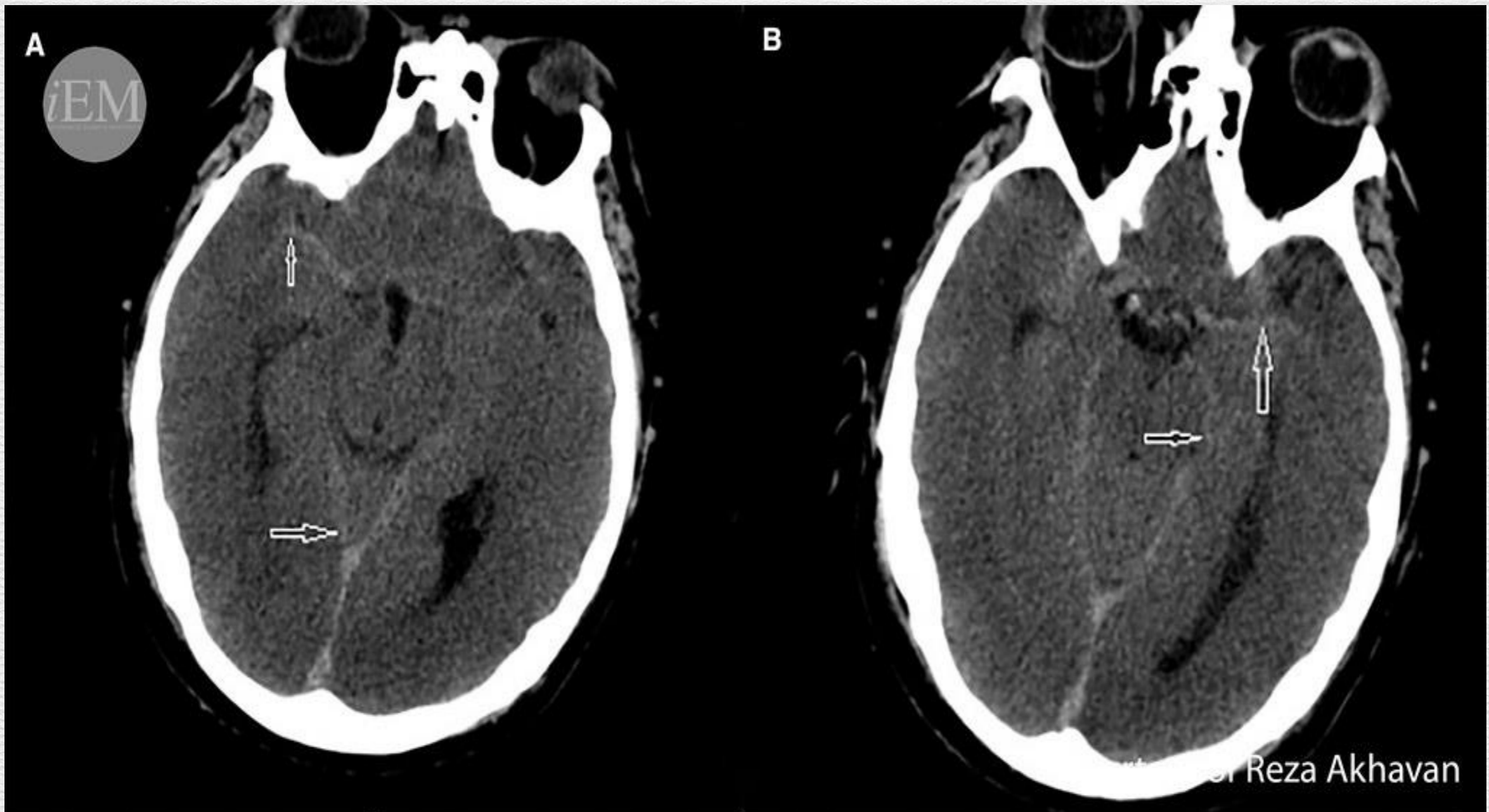
15-20%

- Non-aneurysmal

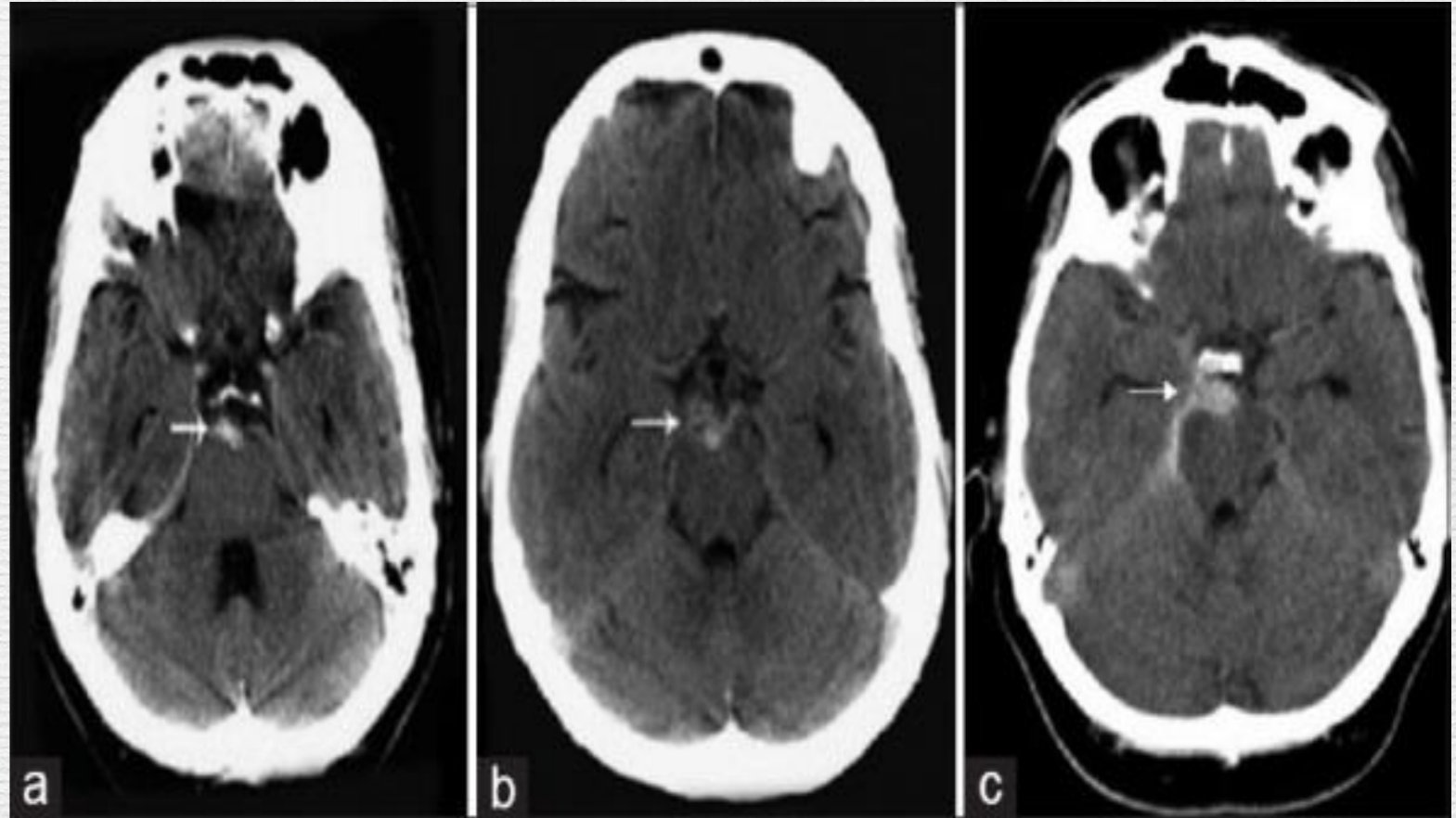
Perimesencephalic  
haemorrhage



# Perimesencephalic SAH



- Younger
- Non-hypertensive
- Males
- Better Grade
- Good prognosis:



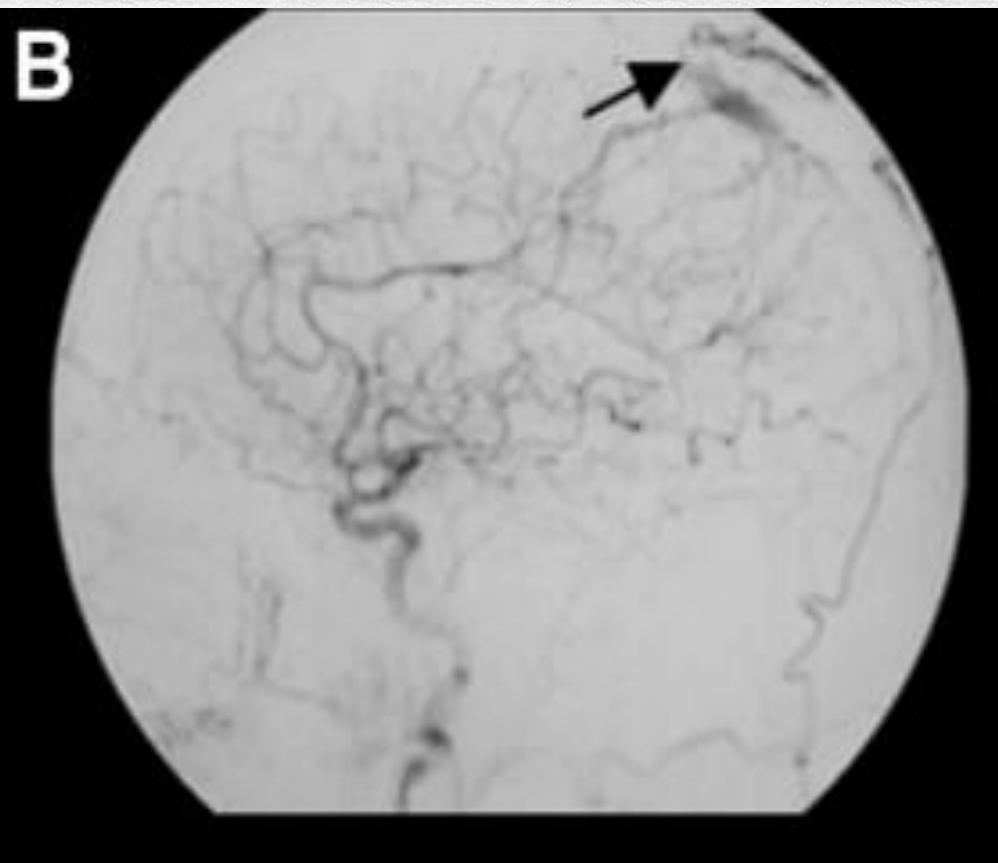
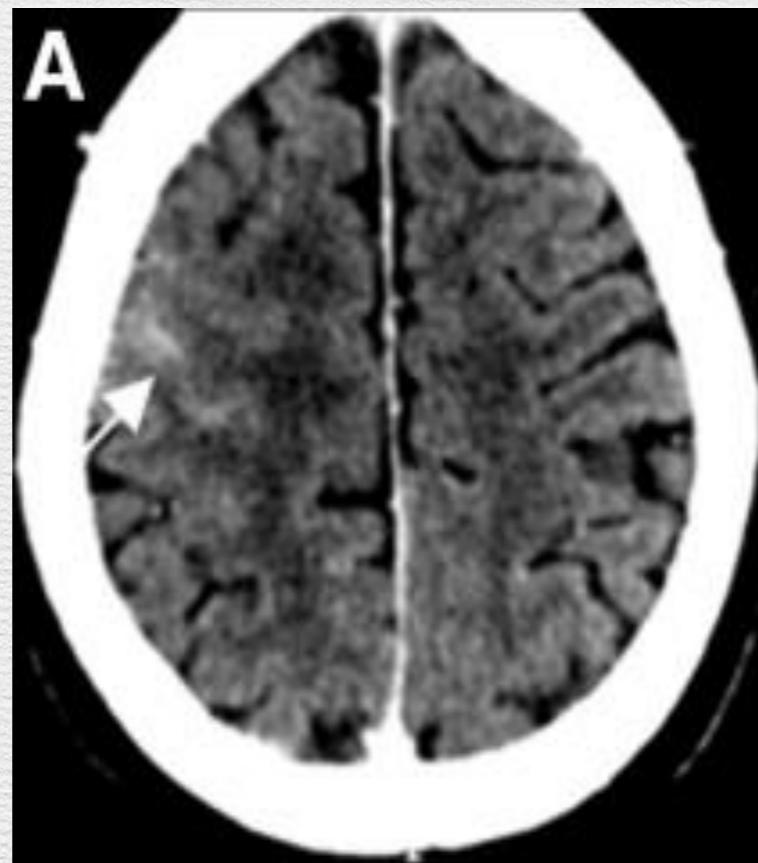
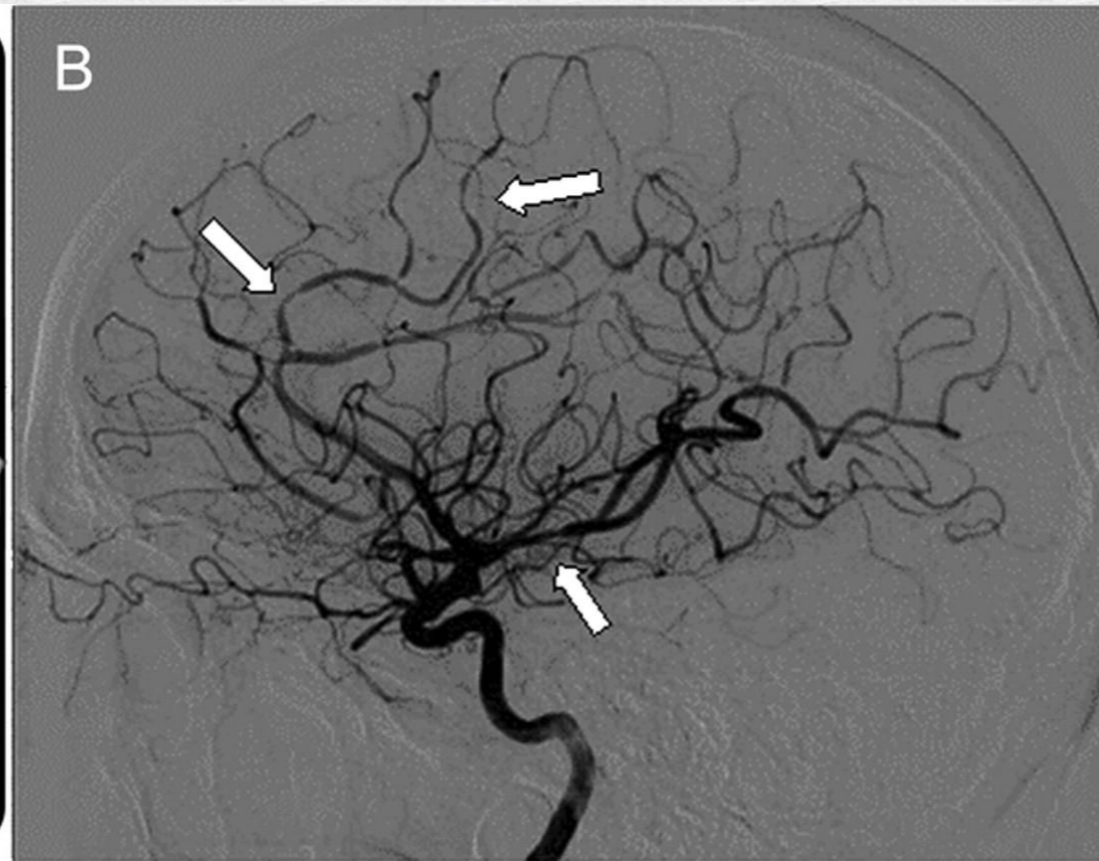
- Re-bleeding is rare
- Delayed ischemic deficit very few

# Types

- Traumatic
- Spontaneous:
  - Aneurysmal
  - Non-aneurysmal
    - Perimesencephalic hemorrhage
    - Convexal SAH

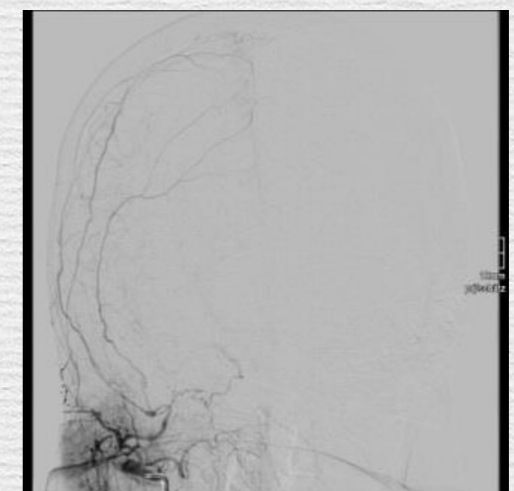
# Convexal SAH

- Radiographic haemorrhage overlying the hemispheric convexities without significant cisternal or sylvian fissure component
- Causes could be significant ICA ~~atherosclerotic stenosis~~, Cerebral Amyloid Angiopathy, Reversible Cerebral Vasoconstriction Syndrome, Cerebral Venous thrombosis, large artery occlusion, posterior reversible encephalopathy syndrome



# Symptoms of cSAH

ICA occlusion	Cerebral Amyloid Angiopathy	Reversible Cerebral Vasoconstriction Syndrome
Sudden onset of transient/persistent focal neurological deficit	Gradual onset of focal neurological deficit that disappear and recur	Headaches



# Types

- Traumatic

- Spontaneous:

- Aneurysmal

- Non-aneurysmal

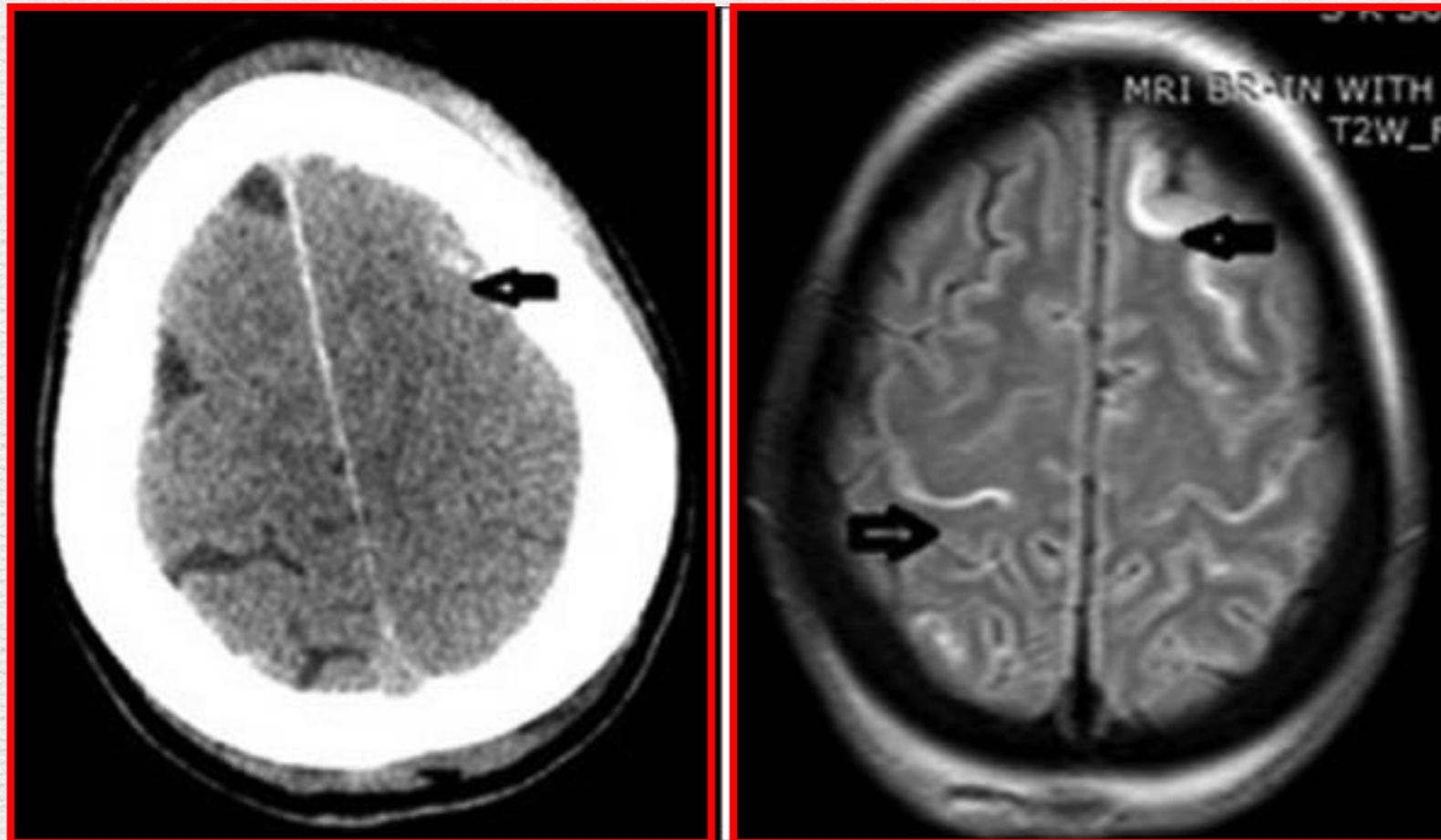
Perimesencephalic  
haemorrhage

Convexal SAH

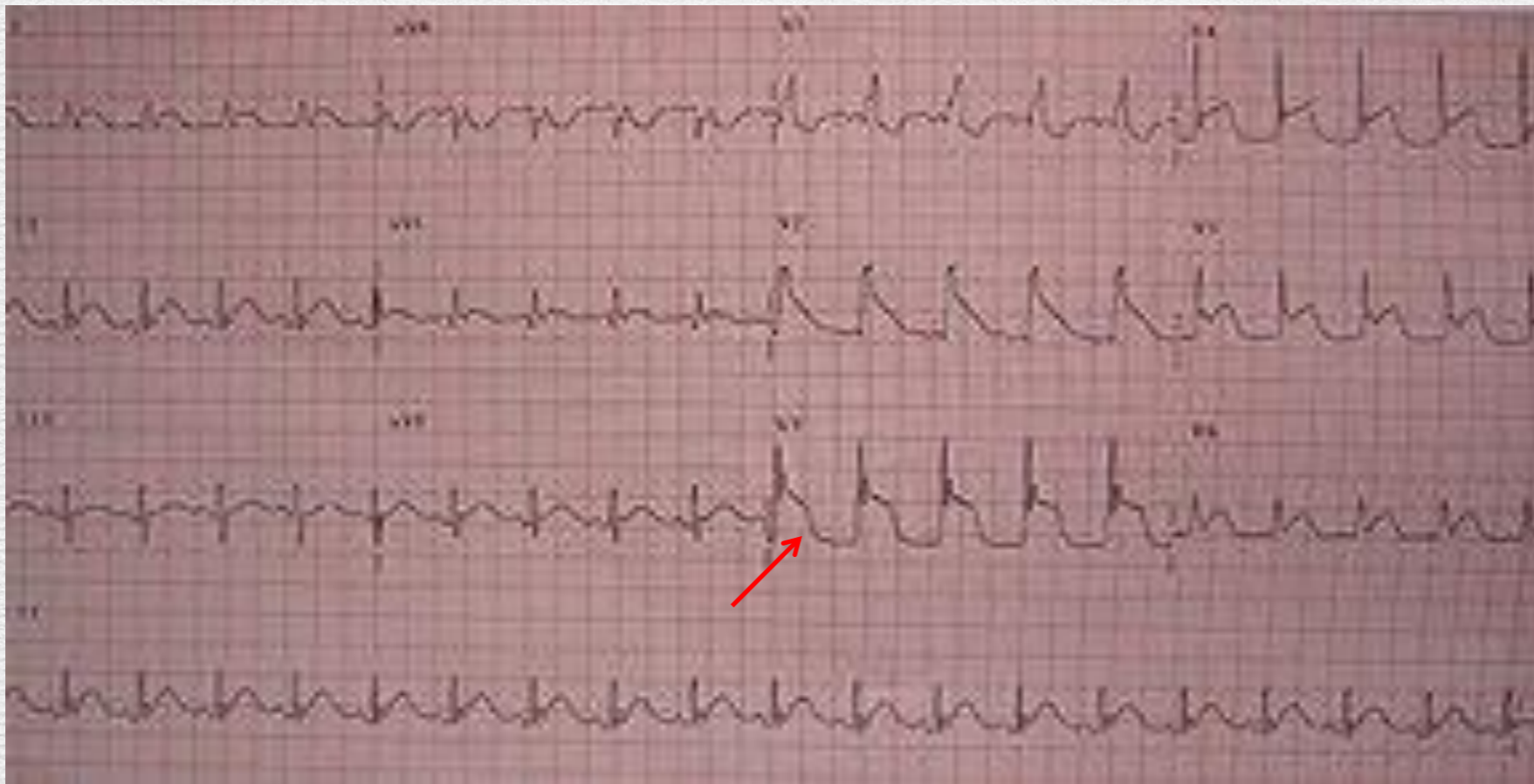
- Cerebral arteriovenous malformations
- Disorders of the blood vessels in the spinal cord
- Bleeding into various tumors
- Cocaine abuse
- Sickle cell anemia
- Anticoagulant therapy

# Diagnosis

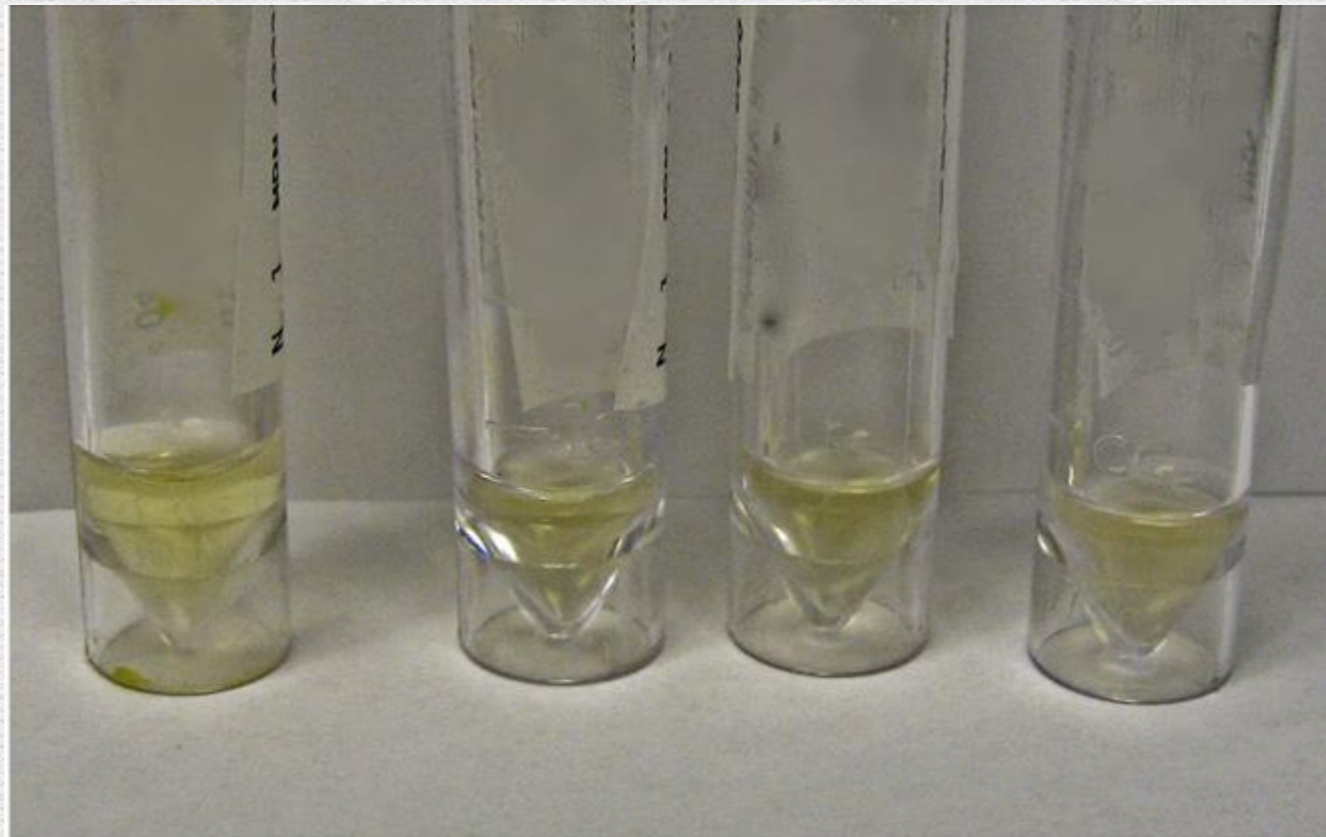
- Neuroimaging: CT- Brain without contrast 98.7% sensitive. MRI is more sensitive than CT after several days.



- ECG : QT prolongation, Q waves, cardiac dysrhythmias and ST elevation



- Lumbar Puncture: Evidence of hemorrhage in 3% patients with normal CT. CSF xanthochromia can detect SAH several days after headache



- Angiography:

Cerebral  
Angiography



CT Angiography



# Subarachnoid Haemorrhage

## Hunt and Hess Scale

### Grade 1

Asymptomatic or mild headache

Minimal/slight nuchal rigidity

### Grade 2

Moderate to severe headache

Nuchal rigidity, no neurologic deficit  
(except for cranial nerve palsy)

### Grade 3

Drowsiness or confusion

Mild focal neurologic deficit

### Grade 4

Stupor

Moderate to severe hemiparesis

### Grade 5

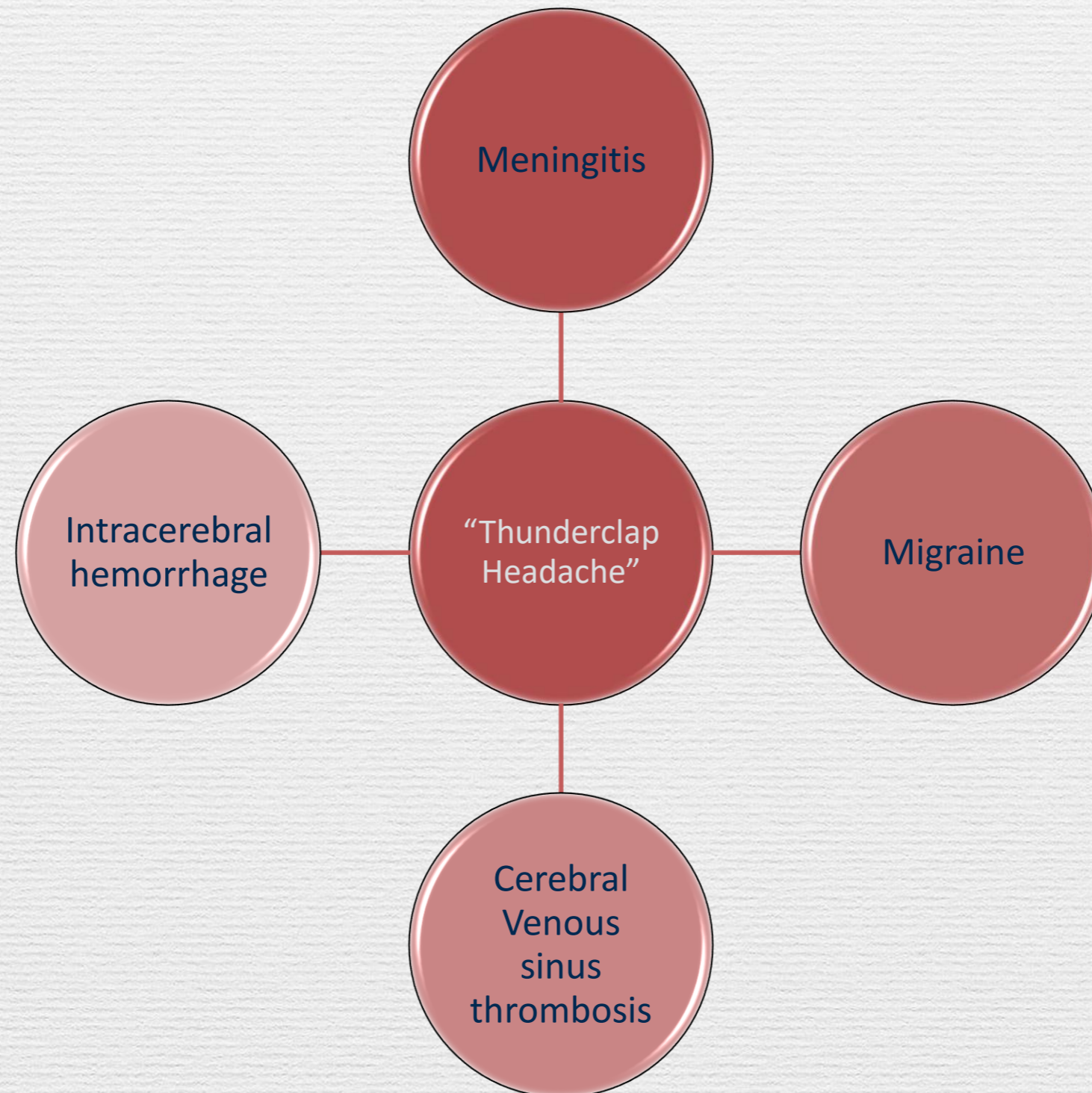
Coma

Decerebrate posturing

## SAH Clinical Grading Scales

<b>Grade</b>	<b>Hunt and Hess</b>	<b>WFNS</b>
0		Intact aneurysm
1	Asxic / mild HA	GCS 15
1a	Fixed neuro deficit s men. or brain rxn	
2	Mod to sev HA, CN palsy, nuchal rigidity	GCS 13–14 no motor deficit
3	Lethargy, confusion, mild focal deficit	GCS 13–14 motor deficit
4	Stupor, hemiparesis, early decerebrate	GCS 7–12 +/- motor deficit
5	Coma, decerebrate, moribund	GCS 3–6 +/- motor deficit

# Differential Diagnosis



# Treatment

## Procedure

- Endovascular coiling
- Clipping

## Medications

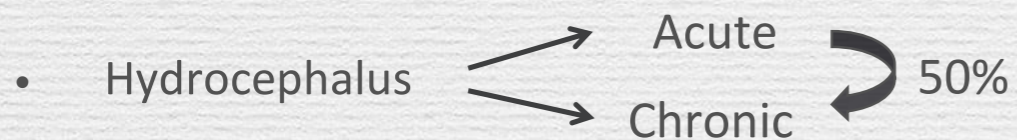
- Antihypertensives
- Diuretics
- Antiemetics
- Anticonvulsants
- Calcium Channels blockers

## Surgery

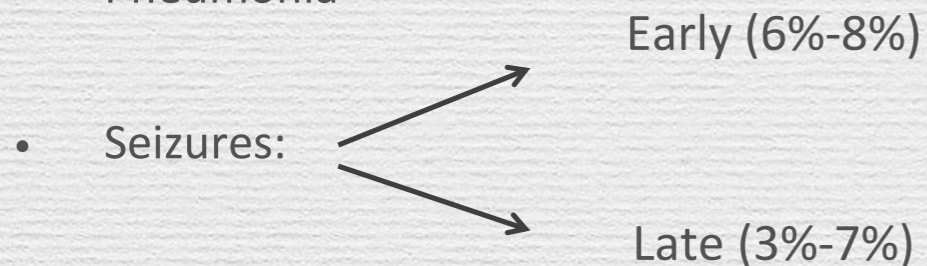
- Ventriculostomy
- Craniotomy

# Complications

- Cerebral Vasospasm:
  - Third day after the aneurysmal event
  - Reaches peak on the 5<sup>th</sup>-7<sup>th</sup> day
  - Stimulation of the tyrosine kinase pathway causing Ca<sup>+</sup> ion release resulting in smooth muscle contraction of cerebral arteries



- Pneumonia



# References

- Watanabe, A., Hirano, K., Kamada, M. et al. Perimesencephalic nonaneurysmal subarachnoid haemorrhage and variations in the veins *Neuroradiology* (2002) 44: 319. <https://doi.org/10.1007/s00234-001-0741-3>
- Longmore, Murray; Ian Wilkinson; Tom Turmezei; Chee Kay Cheung (2007). *Oxford Handbook of Clinical Medicine, 7th edition*. Oxford University Press. p. 841. [ISBN 978-0-19-856837-7](#).
- Ramrakha, Punit; Kevin Moore (2007). *Oxford Handbook of Acute Medicine, 2nd edition*. Oxford University Press. pp. 466–470. [ISBN 978-0-19-852072-6](#).
- van Gijn J, Kerr RS, Rinkel GJ (2007). "Subarachnoid haemorrhage". *Lancet*. **369** (9558): 306–18. [doi:10.1016/S0140-6736\(07\)60153-6](#). [PMID 17258671](#).
- **Clinical Spectrum of Nontraumatic Convexity Subarachnoid Hemorrhage (P3.107)** Vivien Lee, James Connors, Sayona John, Rajeev Garg *Neurology* Apr 2015, 84 (14 Supplement) P3.107;
- Nontraumatic Convexity Subarachnoid Hemorrhage: Different Etiologies and Outcomes Gerales, Ruth et al. *Journal of Stroke and Cerebrovascular Diseases* , Volume 23 , Issue 1 , e23 - e30
- Stroke in a biracial population: the excess burden of stroke among blacks. Kissela B, Schneider A, Kleindorfer D, Houry J, Miller R, Alwell K, Woo D, Szaflarski J, Gebel J, Moomaw C, Pancioli A, Jauch E, Shukla R, Broderick J *Stroke*. 2004 Feb; 35(2):426-31. [\[PubMed\]](#) [\[Ref list\]](#)
- Perimesencephalic hemorrhage: a nonaneurysmal and benign form of subarachnoid hemorrhage. van Gijn J, van Dongen KJ, Vermeulen M, Hijdra A *Neurology*. 1985 Apr; 35(4):493-7