SUBARACHNOID HAEMORRHAGE

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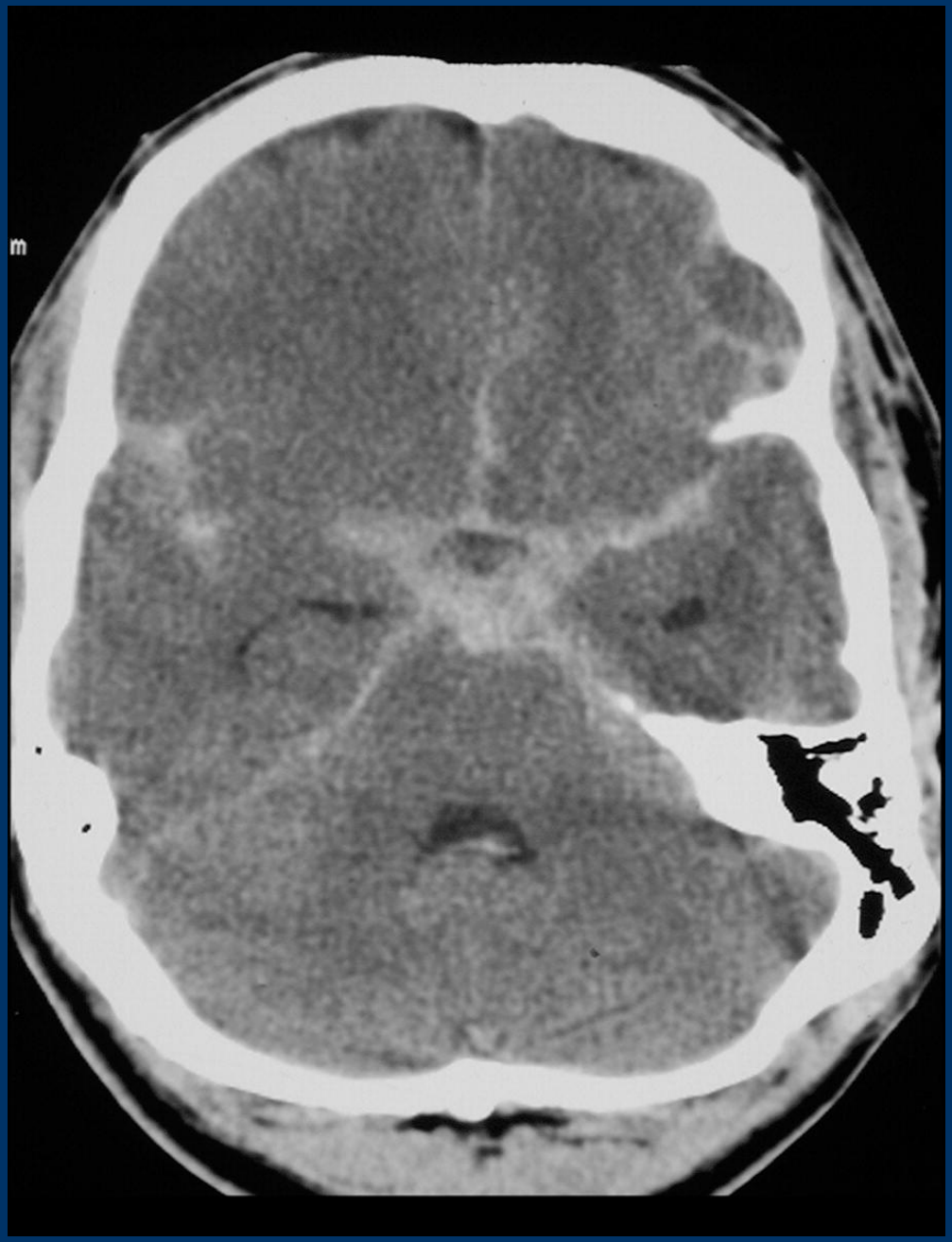
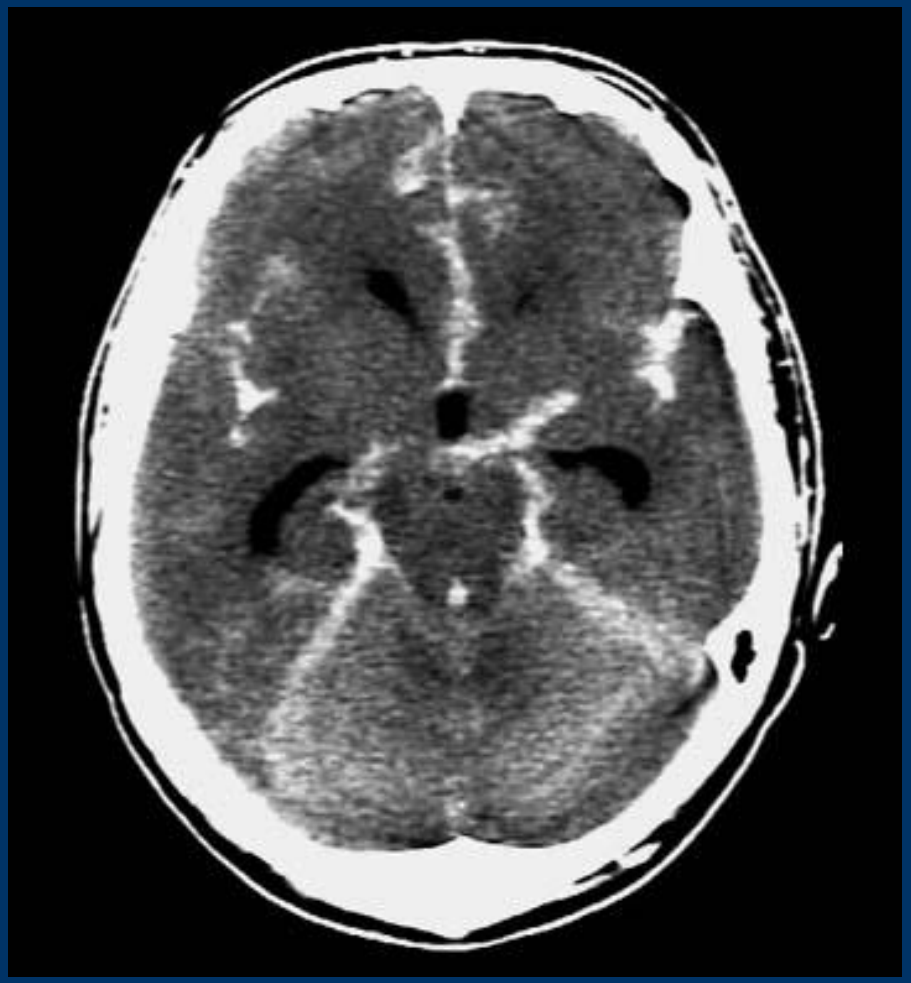


Cerebral aneurysms



EPIDEMIOLOGY

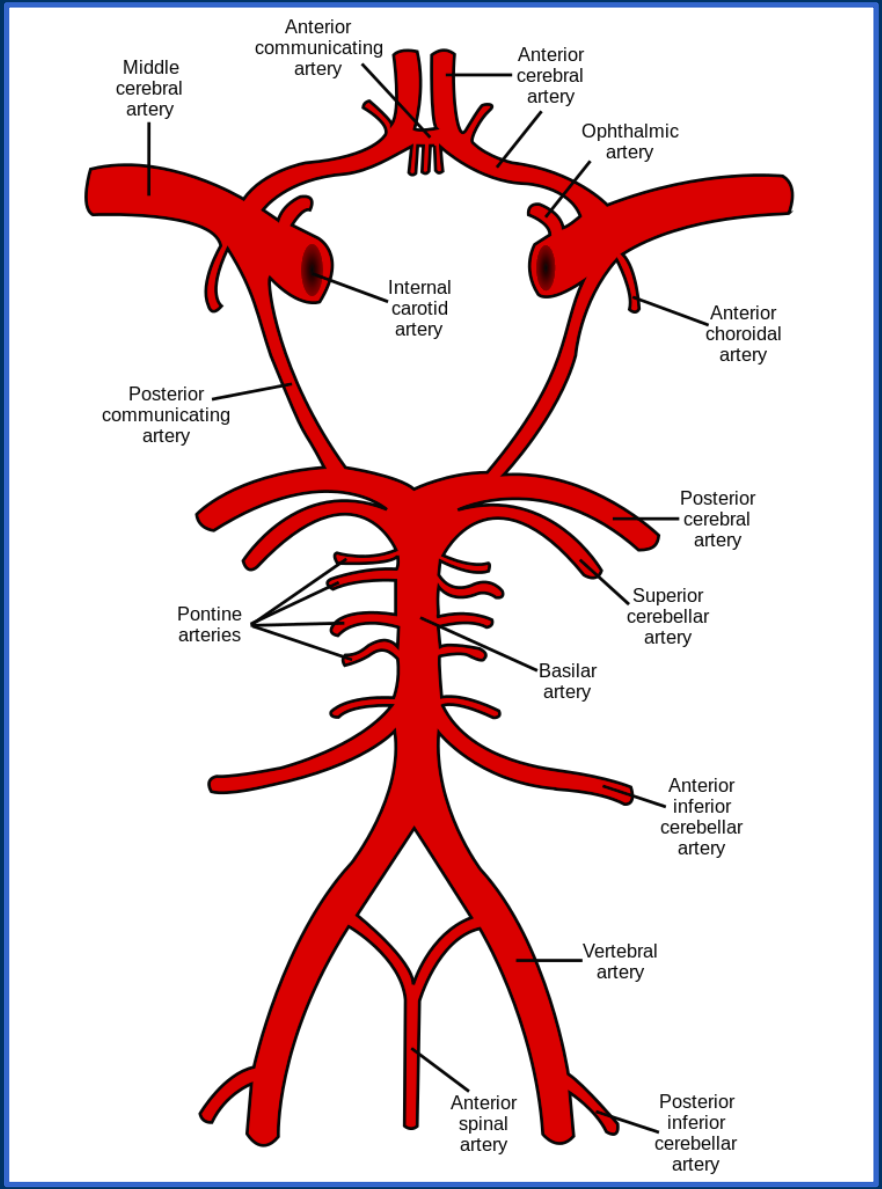
- Spontaneous SAH affects 6-9 people per 100000 per year (~6% of all strokes)
- Intracranial aneurysm ~85%; Perimesencephalic NASAH~10%; ~5% other
- Incidence increases with age, commonest ages 40-60
- 1.6 x higher in women; 2.1x higher in Afro-Carribeans

RISK FACTORS

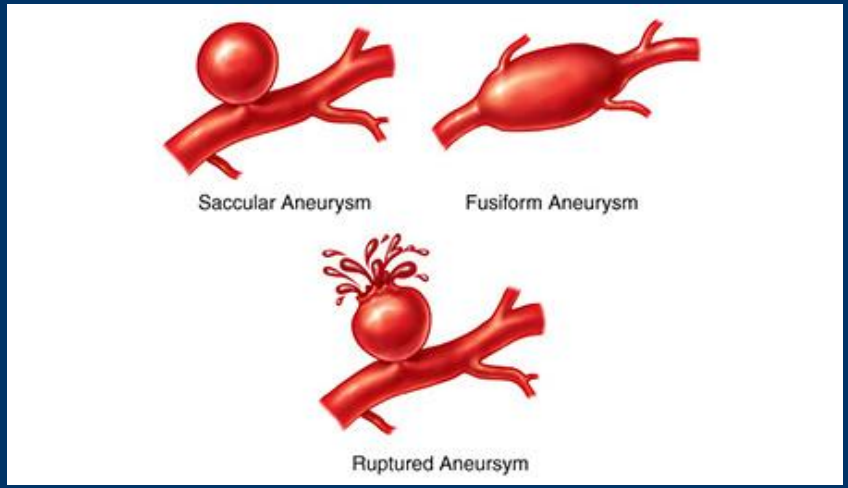
- Hypertension
- Smoking
- Excessive alcohol consumption
- Illicit drugs - cocaine

- Genetic disorders- APKD, EDS IV, NF 1
- Familial- accounts for ~10%
  - First degree relatives 3-7x risk compared to general population

ANEURYSMS



- Prevalence of ~4%
- Most <7mm don't rupture but grow unpredictably
- 85% on Circle of Willis
- Multiplicity - 30%
- Saccular



PRESENTATION

- Sudden onset explosive headache
- Neck stiffness
- Nausea & vomiting
- Sensitivity to light (photophobia)
- Blurred/double vision
- Stroke-like symptoms (weakness, slurred speech)
- Loss of consciousness
- Seizures

INVESTIGATIONS

- CT Brain: 95-98% sensitive within 24 hours of symptom onset
- CTA Brain: contrast enhanced CT of blood vessels
- Cerebral catheter angiogram- injecting contrast through a catheter to brain arteries
- Lumbar Puncture
- MRI

MANAGEMENT

- Supportive: neurosurgical unit, anaesthetic support, medications
- Initial aim: prevent rebleed! After 24 hrs rebleed risk is ~40% over 4 weeks. 51-80% mortality
- Open surgical clipping vs endovascular coiling
- Prevent secondary complications
  - Hydrocephalus
  - Vasospasm → delayed cerebral ischemia

COMPLICATIONS

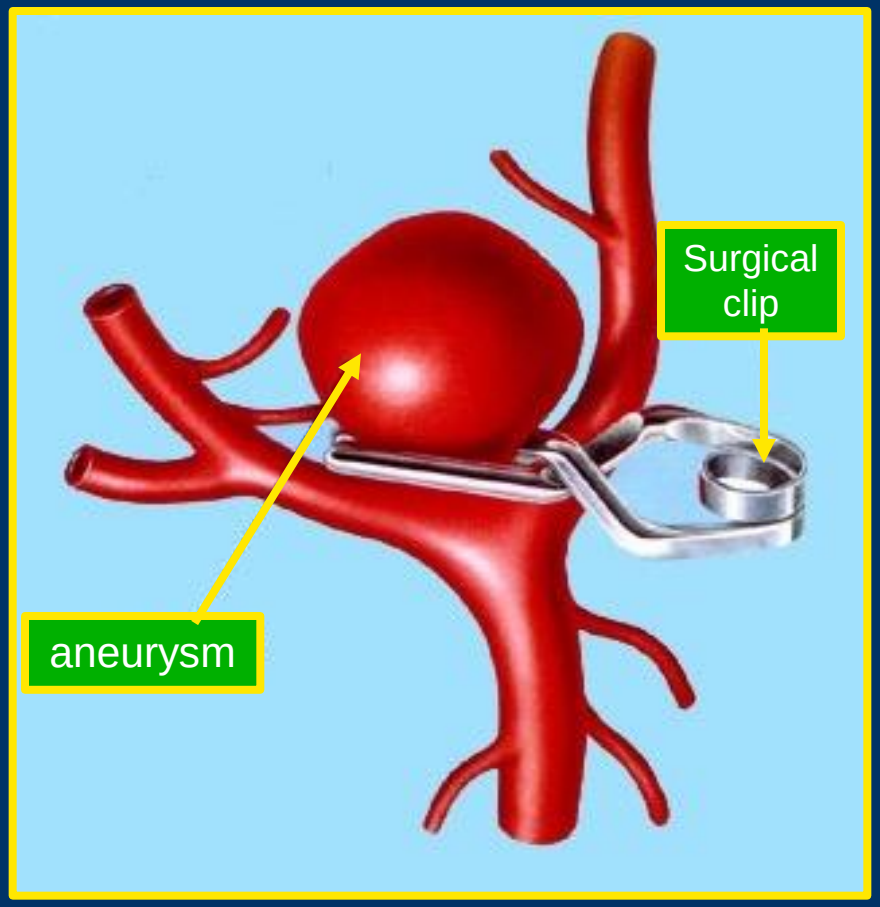
- Not all patients can be saved- 50% mortality including those who die pre-hospital (~10-15%)
- Vasospasm: serious & common complication (30%) leading to ischemic brain injury
- Hydrocephalus: short term & long term
- Epilepsy ~5%
- Multi-organ failure

PROGNOSIS

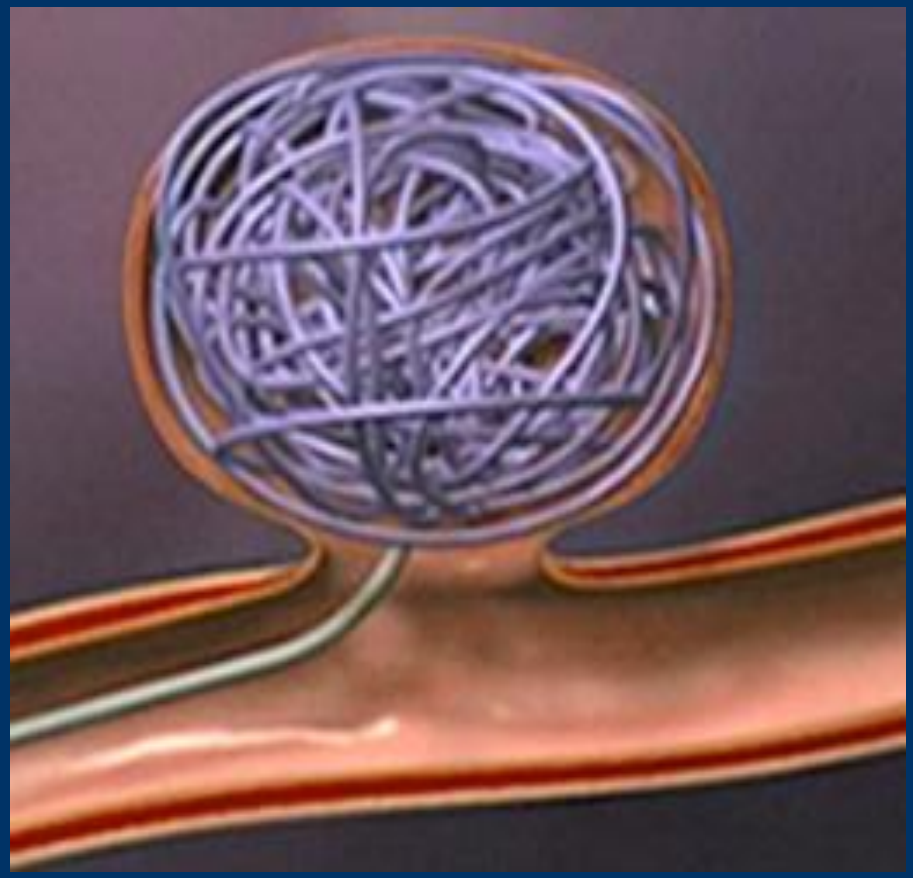
- Prognosis/outcome related to initial presentation, age, amount of blood on CT
- Improvement: 4-18 months post SAH
- Cognitive impairment in 46% affecting QoL
- Headaches- 60% Hormonal dysfunction-25%
- Extreme tiredness, personality changes, depression, anxiety, sleeping problems
- Complete recovery without psychosocial/neurological problems ~25%

An Insight into Interventional Neuroradiology

Surgical Clipping



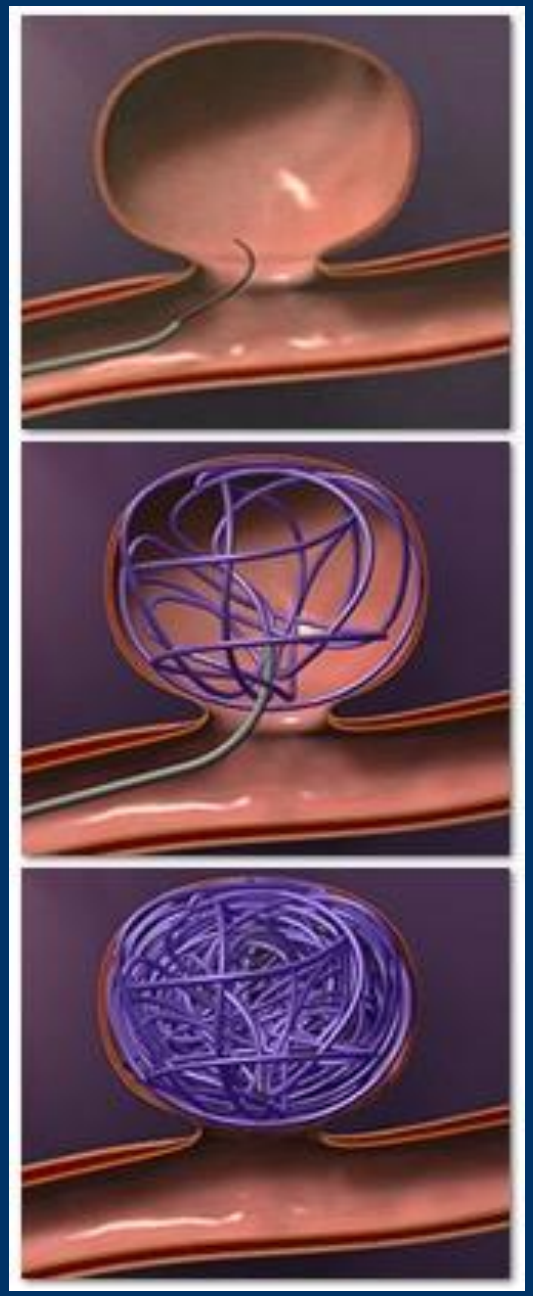
Endovascular coiling

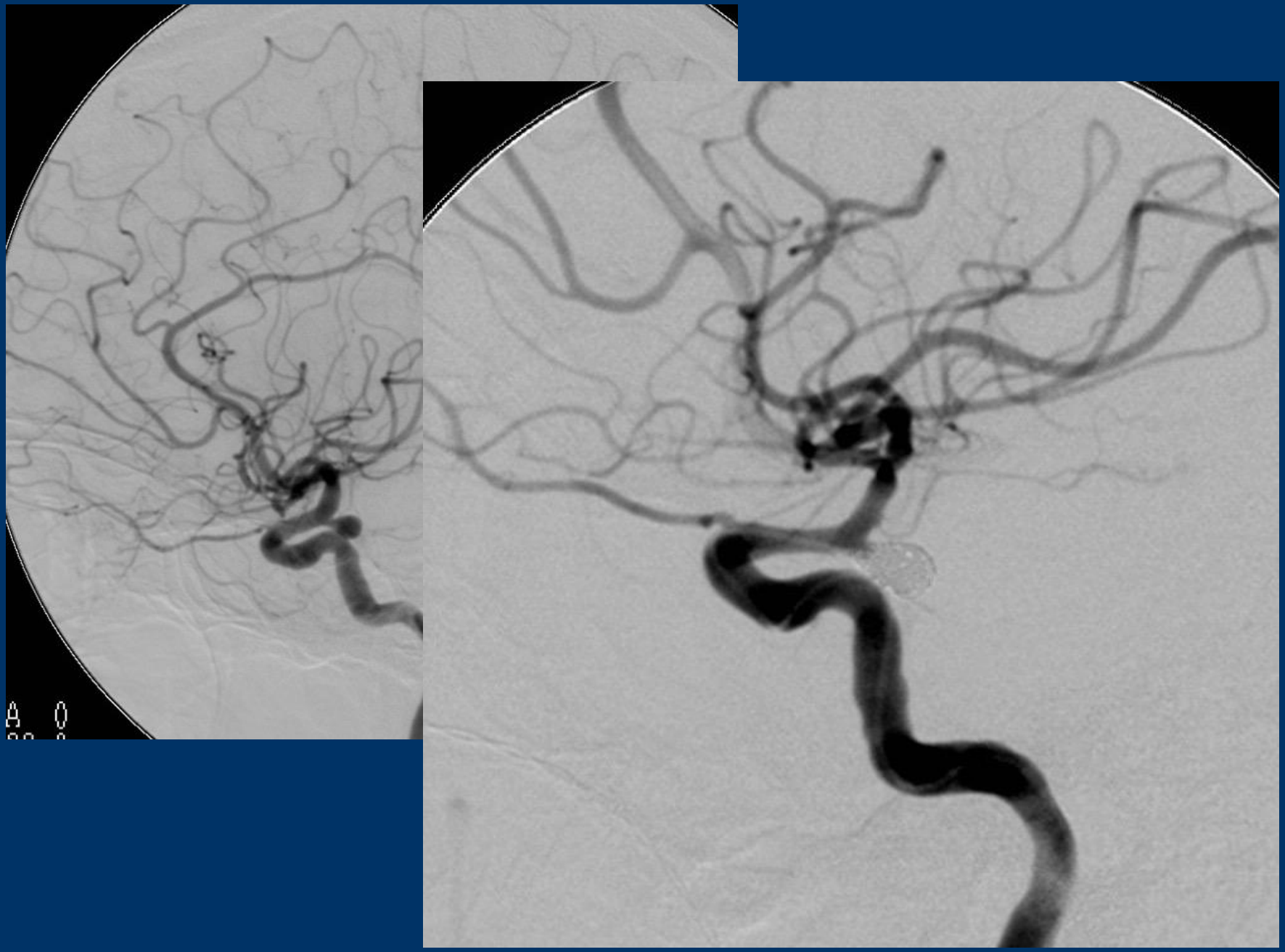


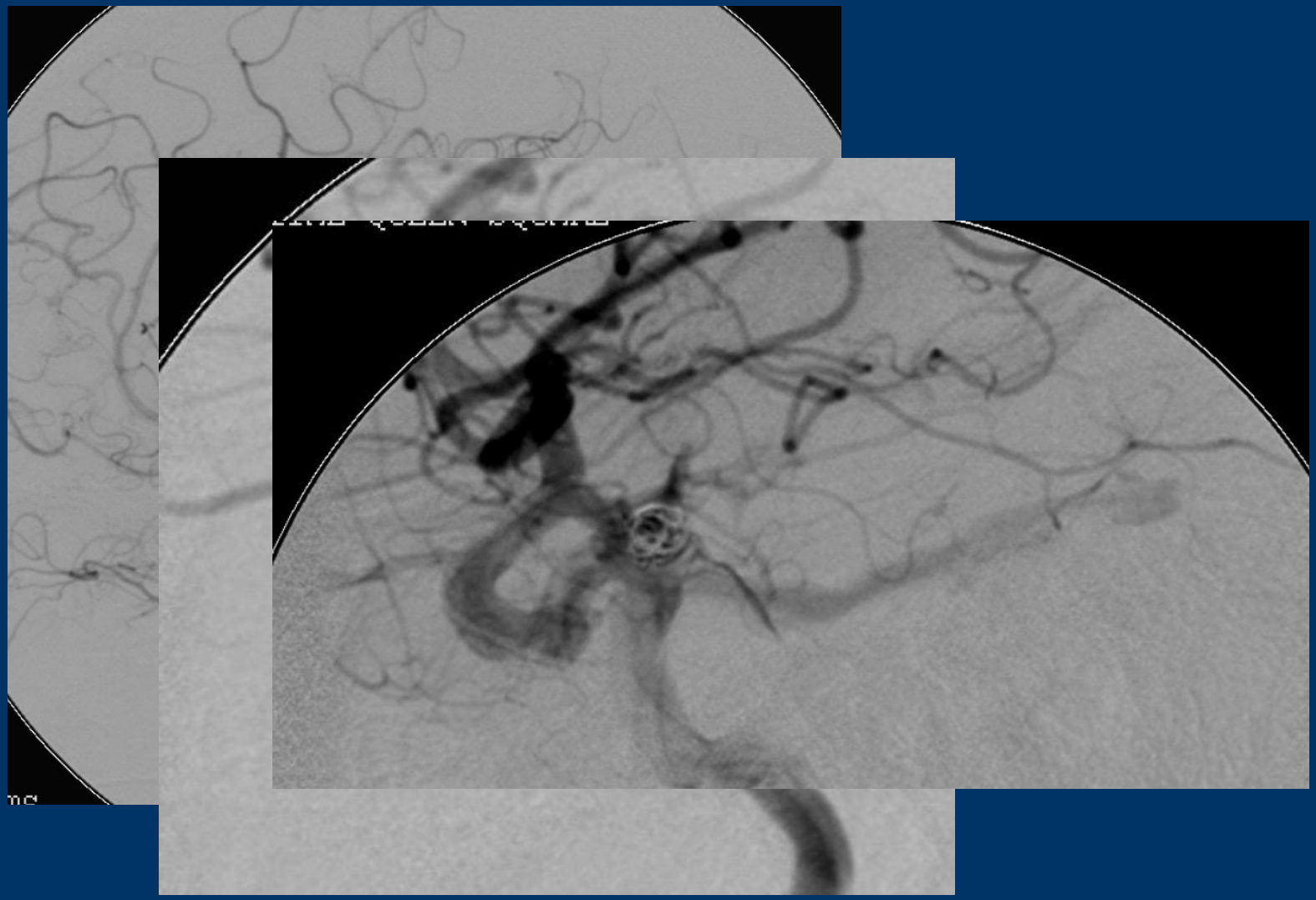
ISAT : International Subarachnoid Aneurysm Trial 2002
Coiling > clipping

The angiography suite

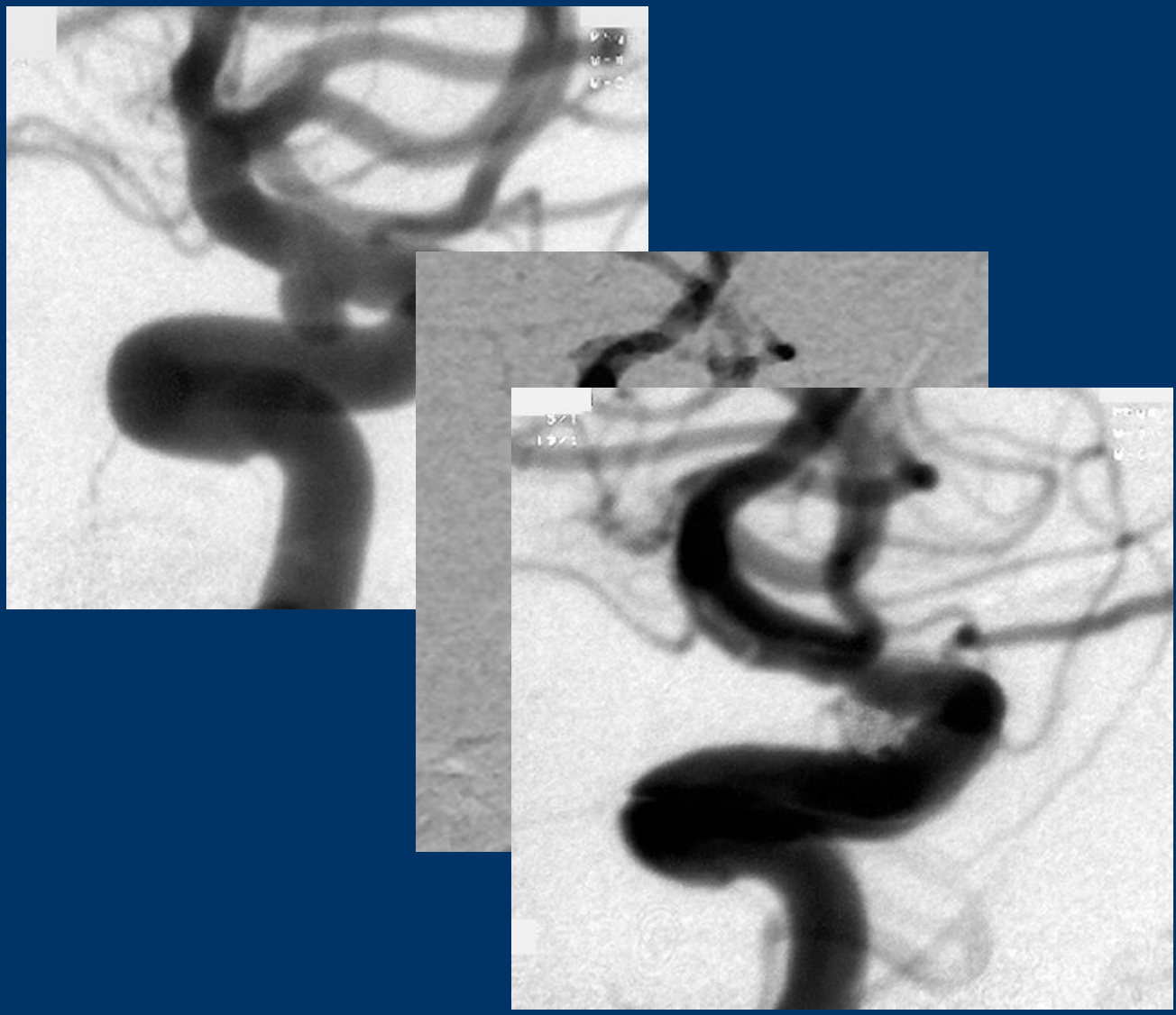
‘Coiling’







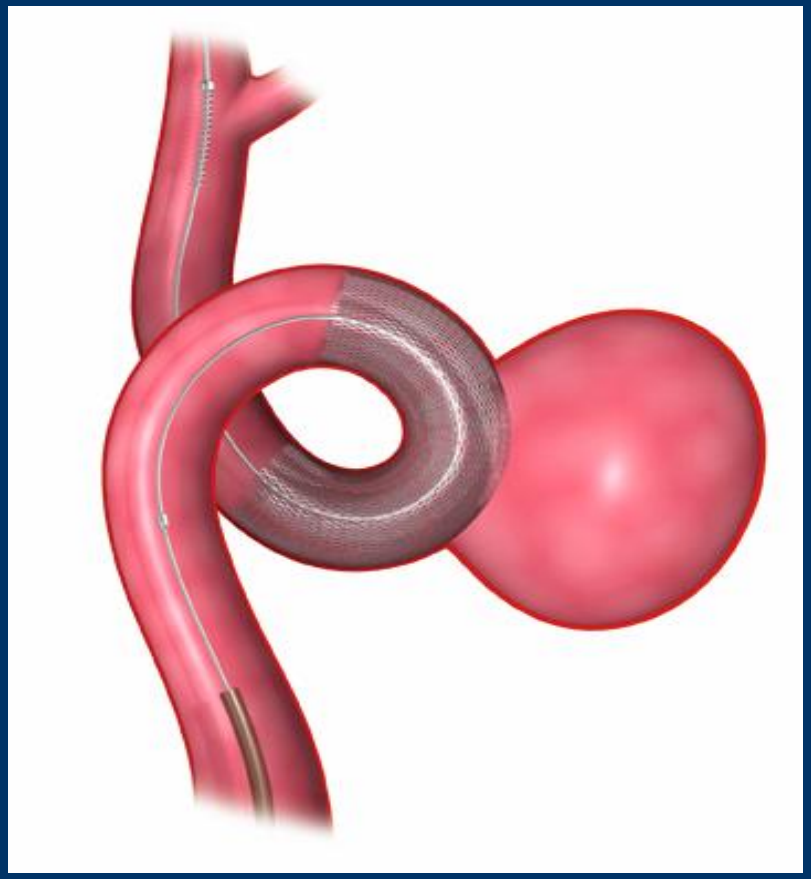
Difficult aneurysms : Balloon Remodelling



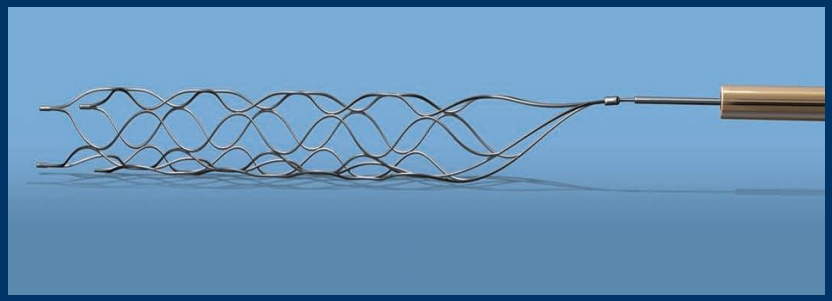
Stents in Cerebral Aneurysm Treatment

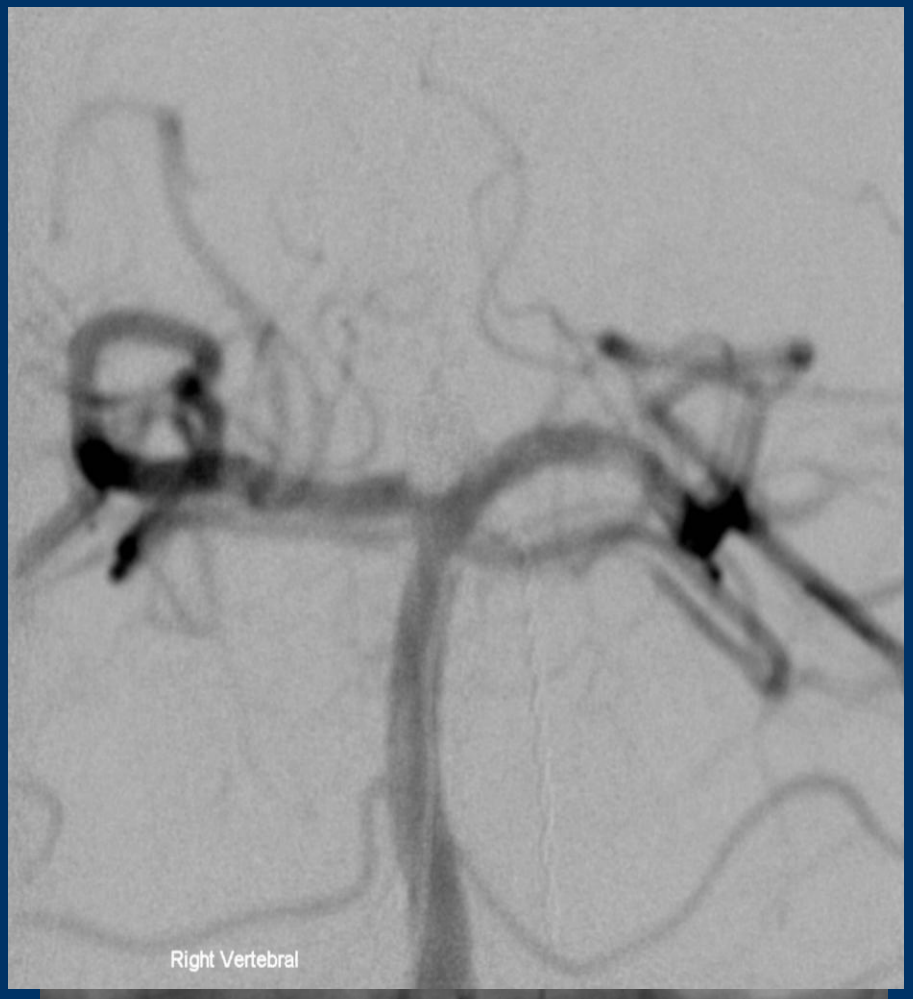
Stent assisted coiling

Flow diverting stent



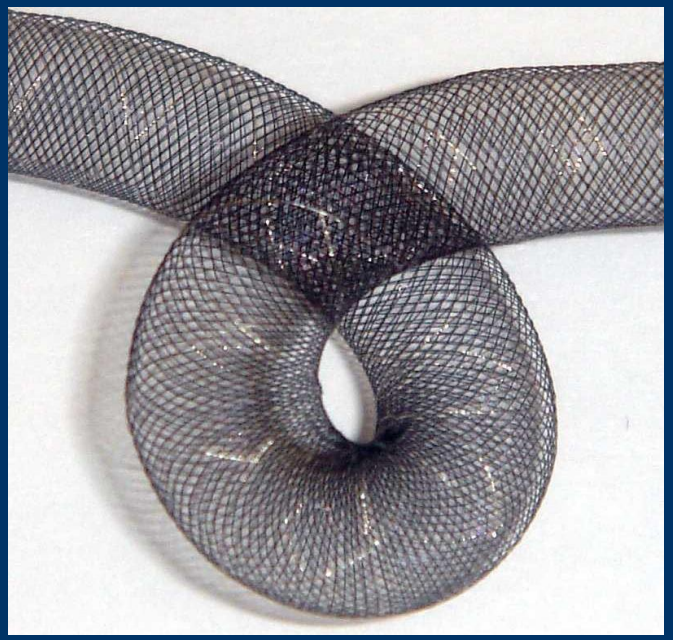
Stent assisted coiling





ASPIRIN 6 months / CLOPIDOGREL 8 weeks

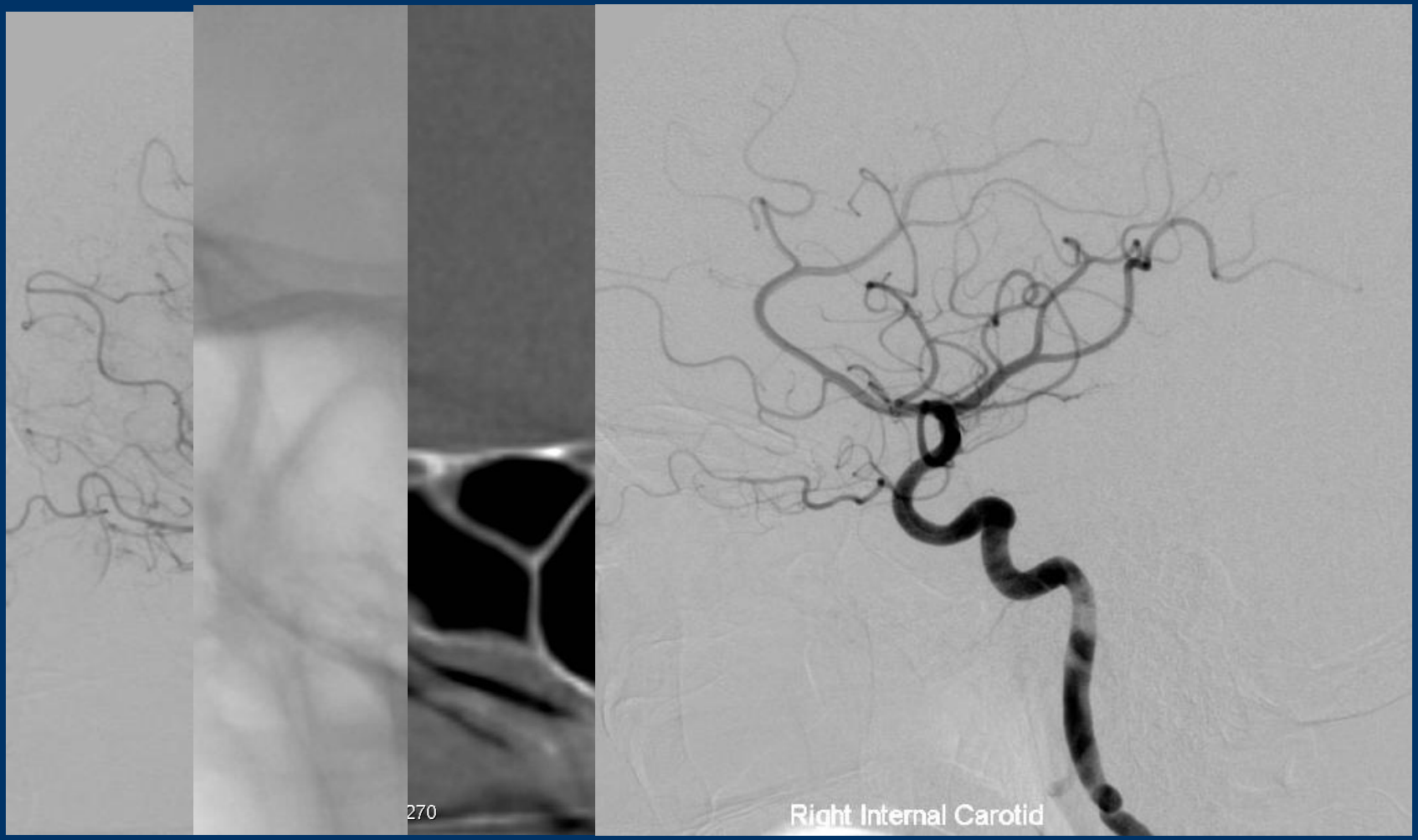
Flow diverting stents (Queen Square)



SILK (Balt, Fr)

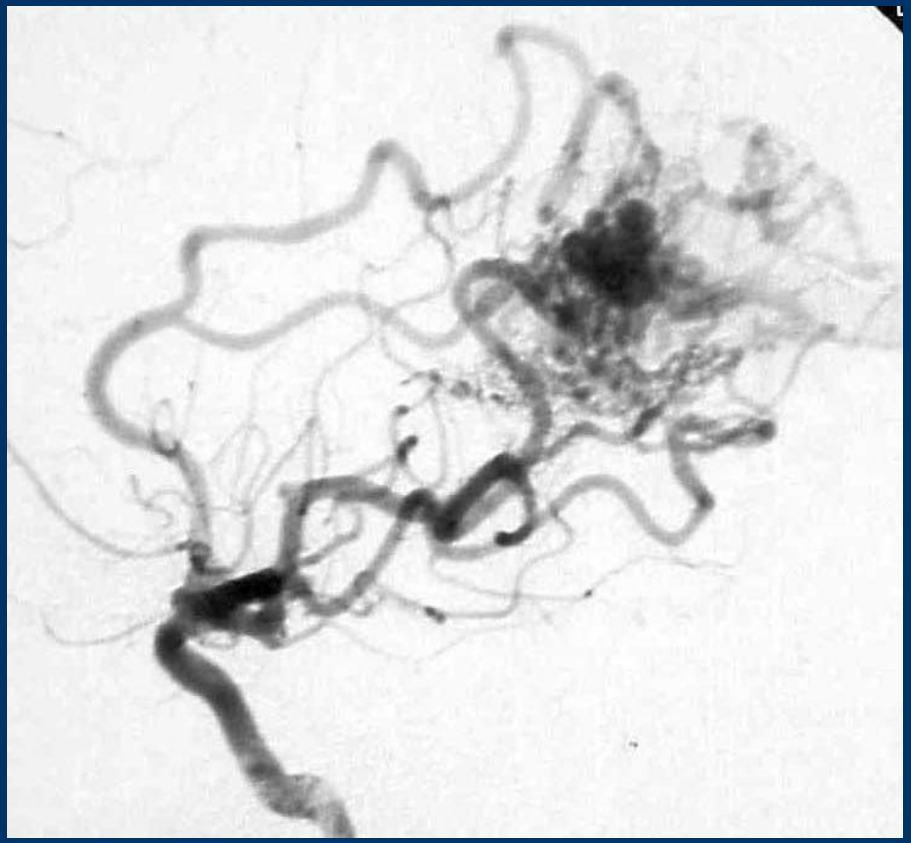
PIPELINE (eV3, US)

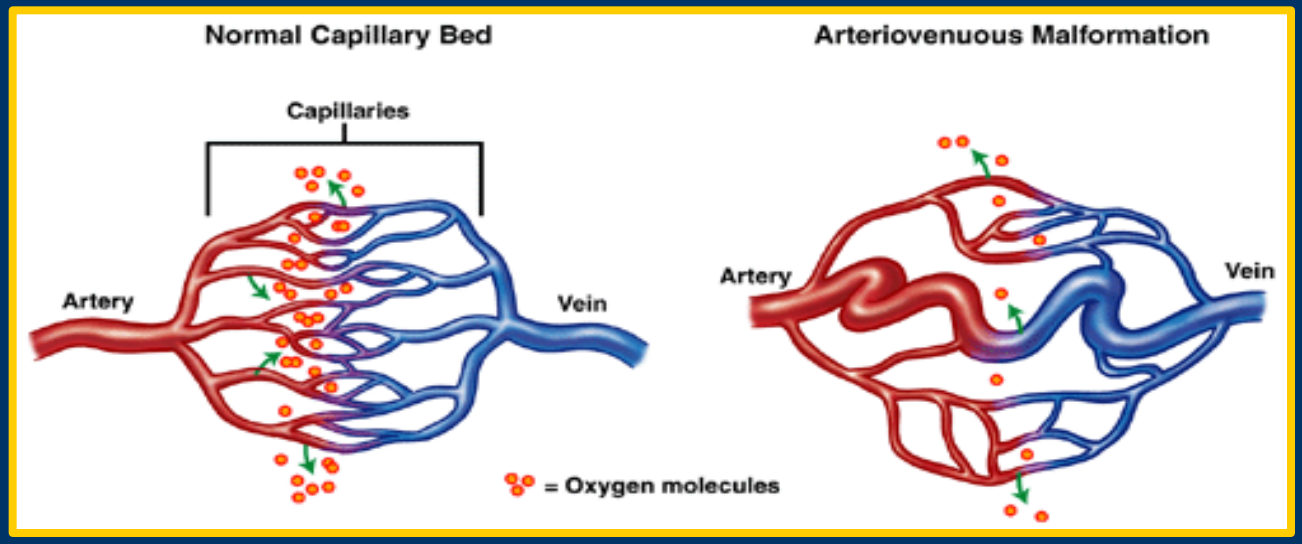
Flow diverting stent

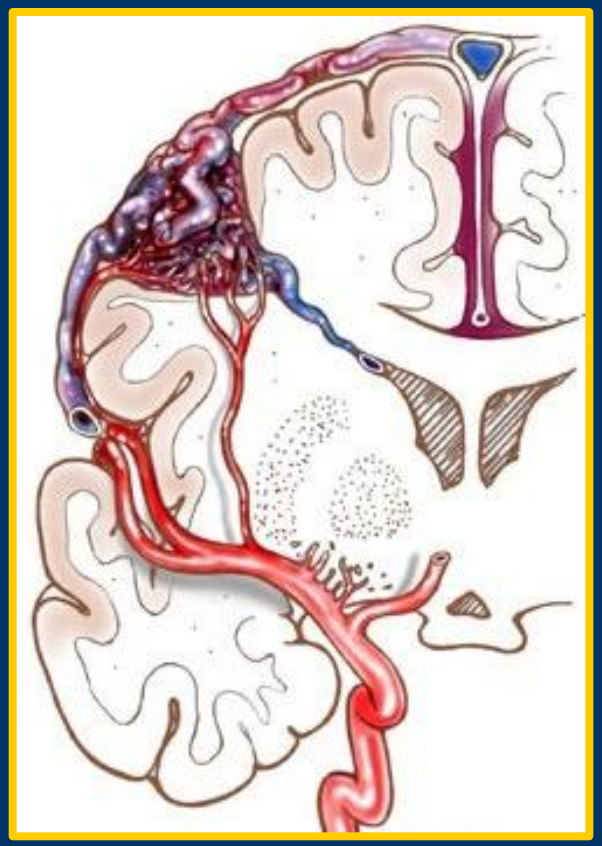


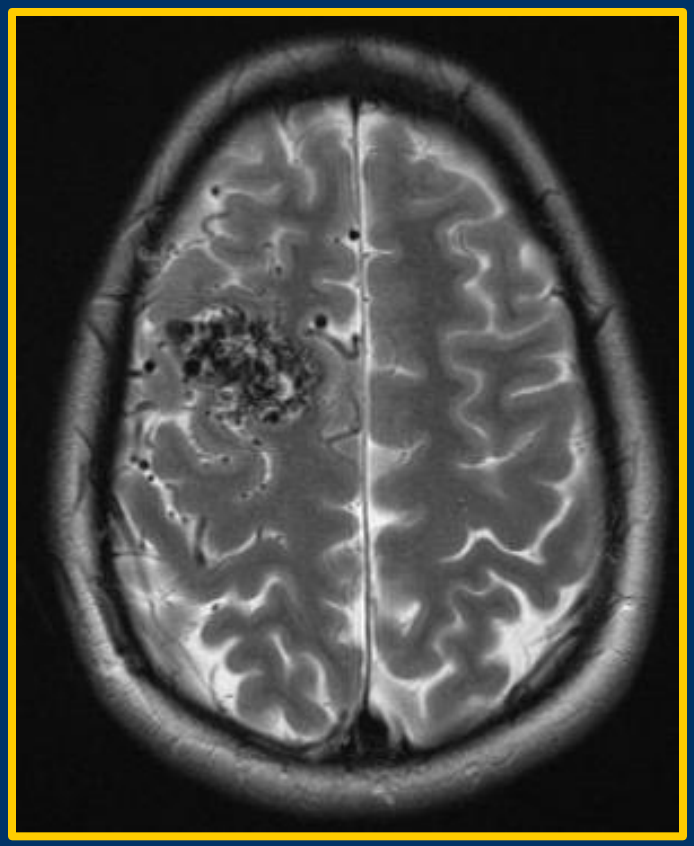
ITU 24 hours / SC Heparin / IV Fluid haemodilution
ASPIRIN 6 months / CLOPIDOGREL 3 weeks

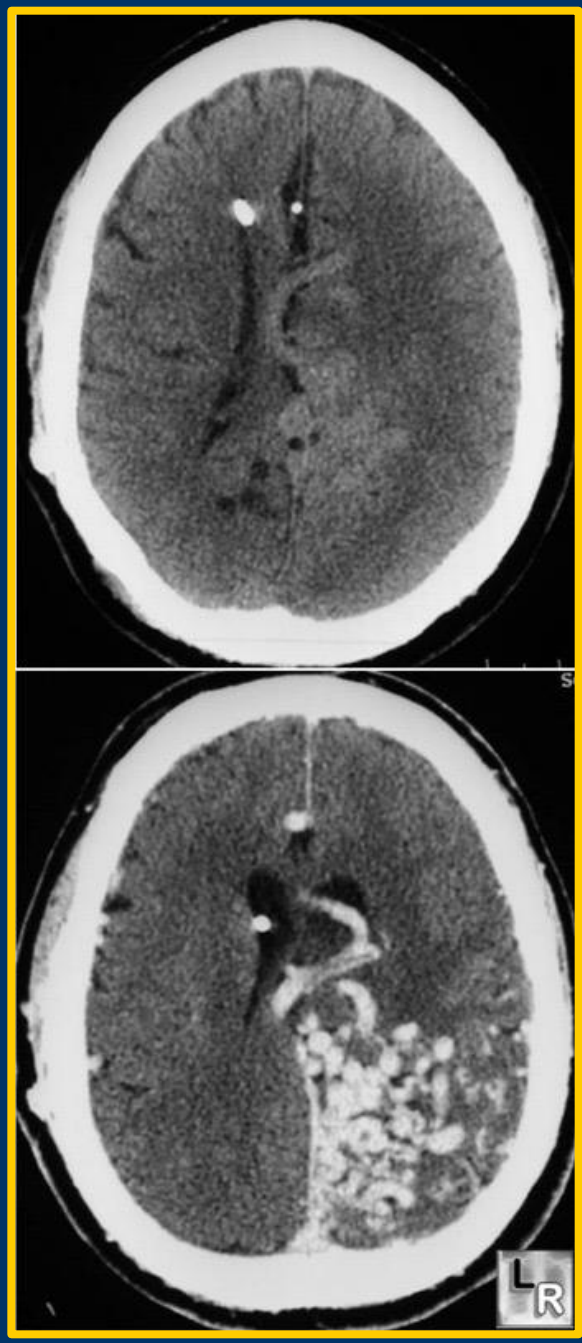
AVM




Normal Capillary Bed
Capillaries
Artery
Vein
= Oxygen molecules
Arteriovenuous Malformation
Artery
Vein






L
R

Cerebral AVM Treatment - Multidisciplinary

Disconnect AV shunt

Surgery:

superficial / non-eloquent

Gamma knife:

smaller AVMs

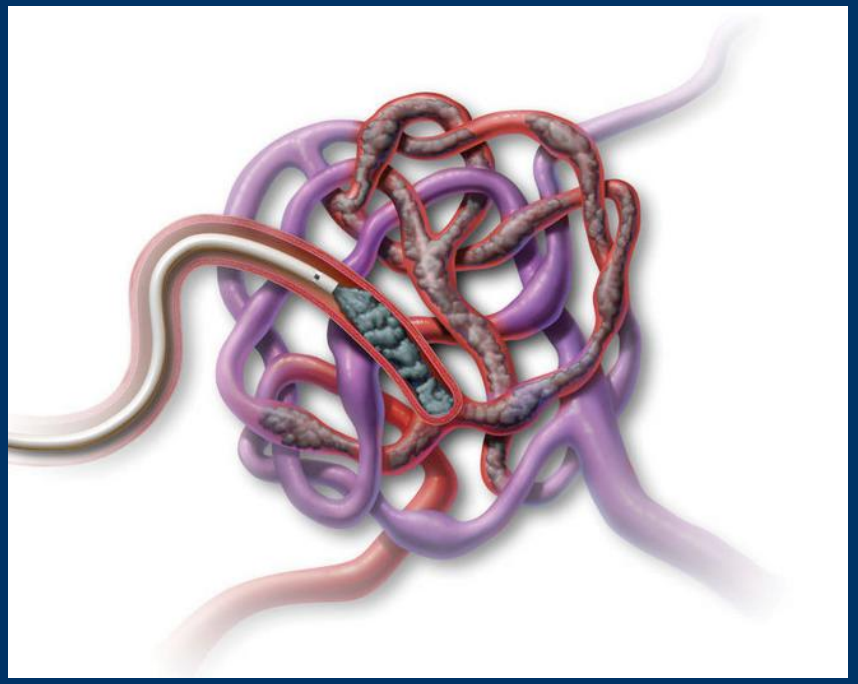
low bleeding risk

Endovascular : liquid embolic agents

Glue

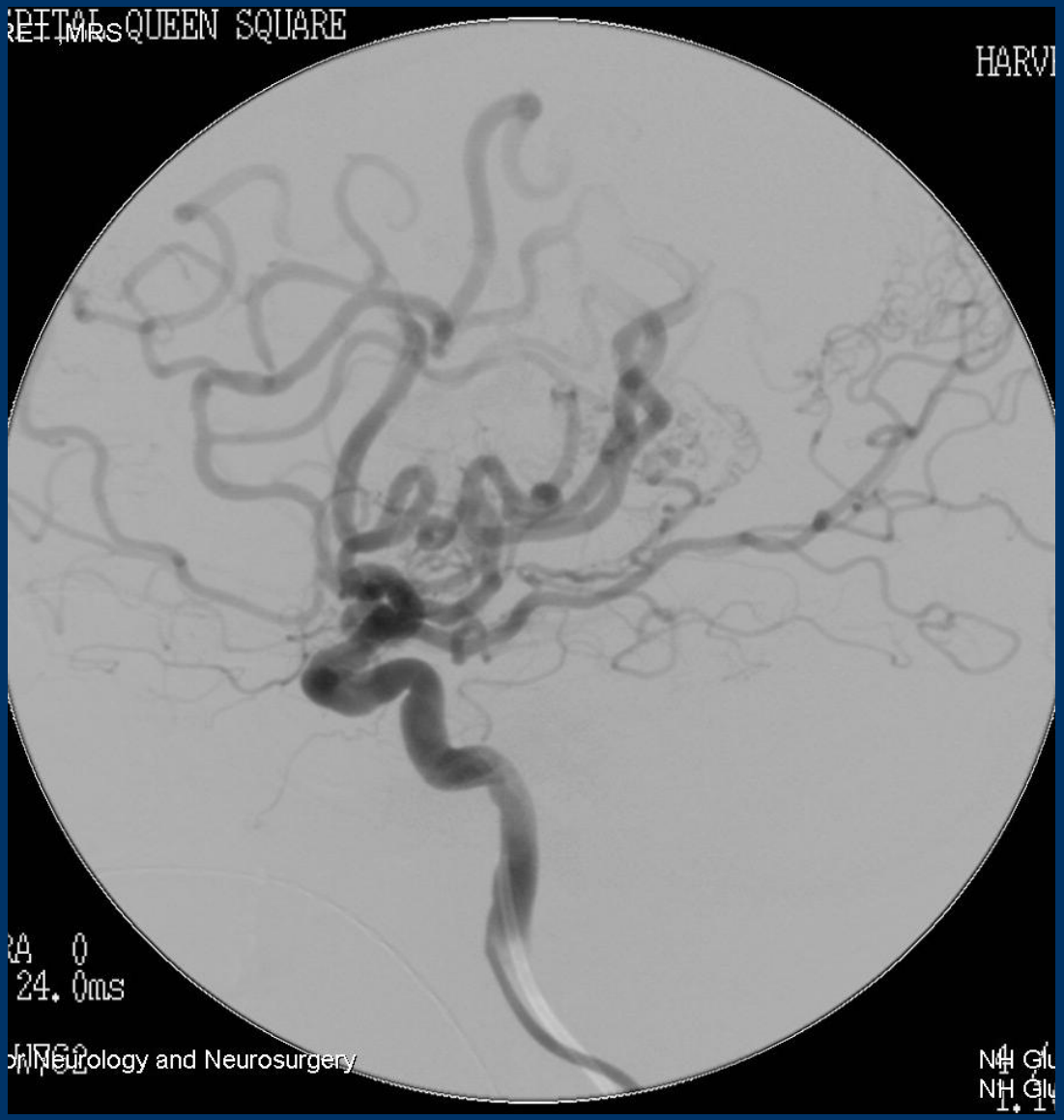
n-Butyl-2 Cyanoacrylate (tissue adhesive)
Mixed with lipiodol

ONYX



EVOH (ethylene vinyl alcohol) copolymer dissolved in **DMSO** (dimethyl sulfoxide), suspended micronized **tantalum** powder


HARV
NH Glue
NH Glue


QUEEN SQUARE
HARVI
24.0ms
Neurology and Neurosurgery
NH Glu
NH Glu

Any Questions?