



Interventional Neuroradiology II

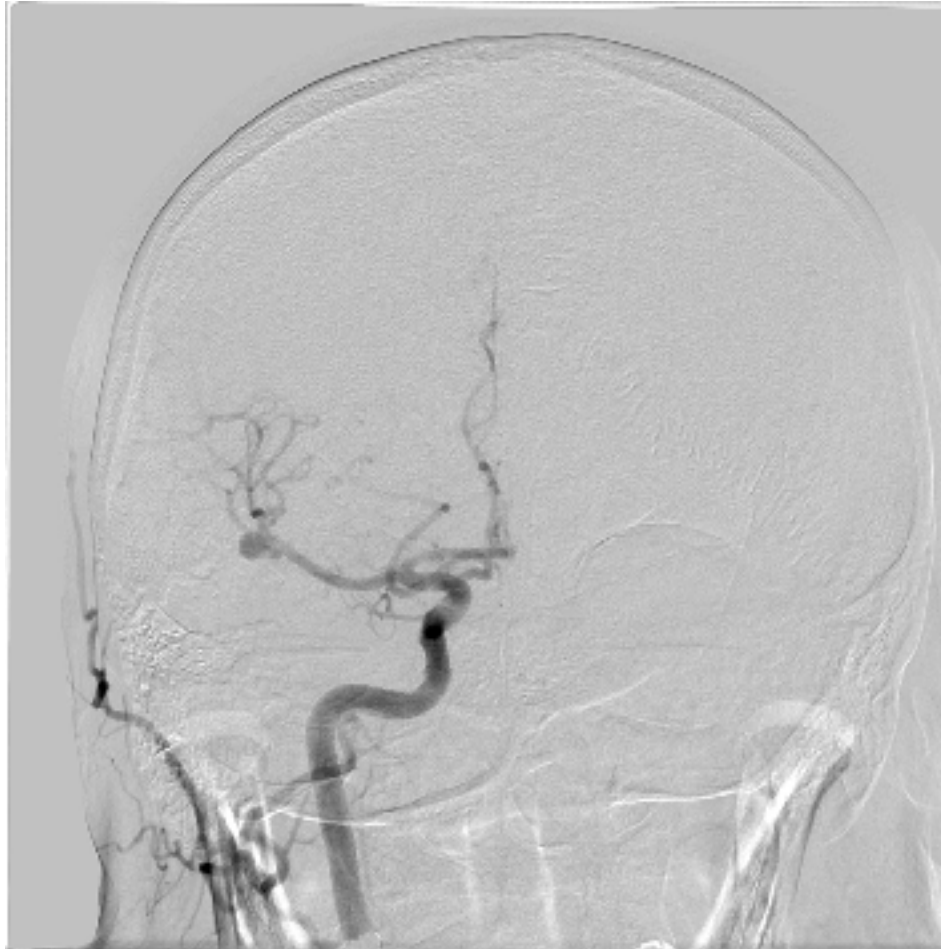
Interventional Procedures

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Diagnostic and Interventional Neuroradiology

Studiengang Medizintechnik WS 2017/18

What is wrong?



Aneurysm of middle cerebral artery

Cerebral aneurysms

- Incidence 2 %
- Risk for hemorrhage within 5 years: 5 %
- additional risk factors:
 - lobulated configuration
 - size > 5mm
 - multiple aneurysms
 - posterior circulation
 - growth

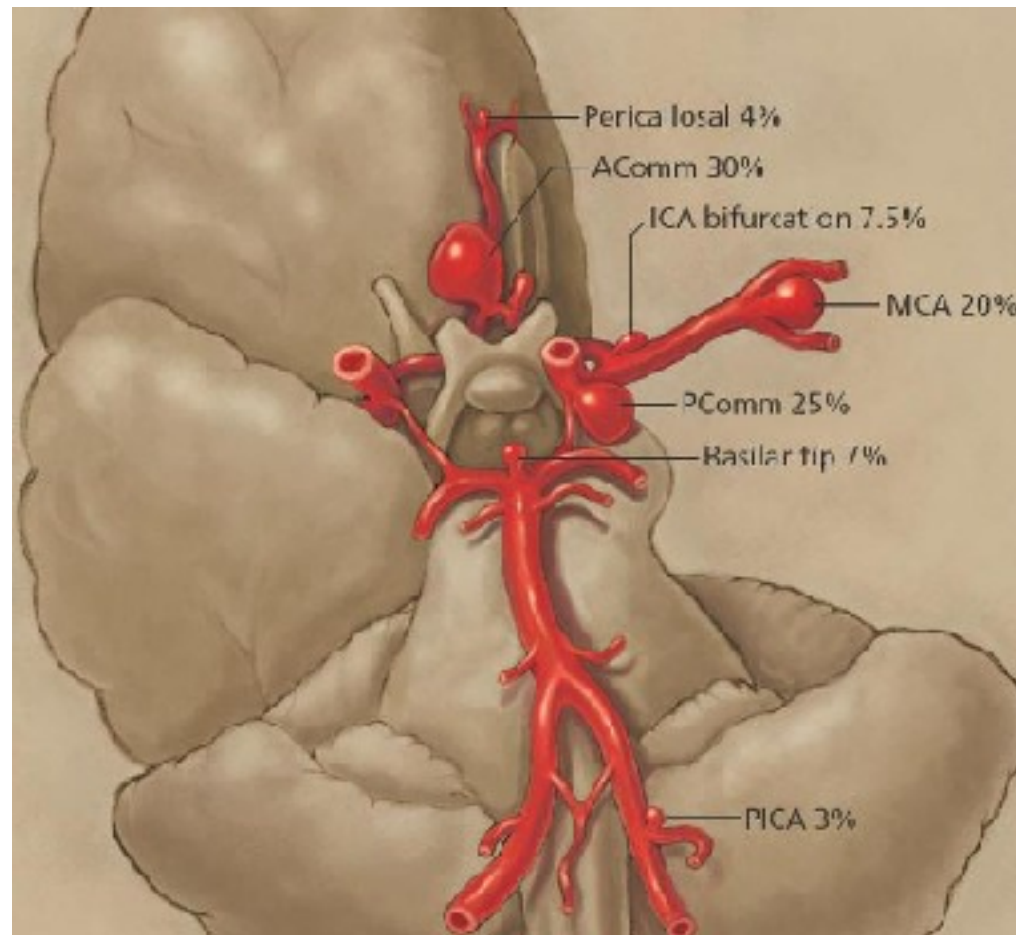
Sonobe M et al., Stroke 2010; 41: 1969-1976

Small unruptured intracranial aneurysm verification study: SUAVE study, Japan

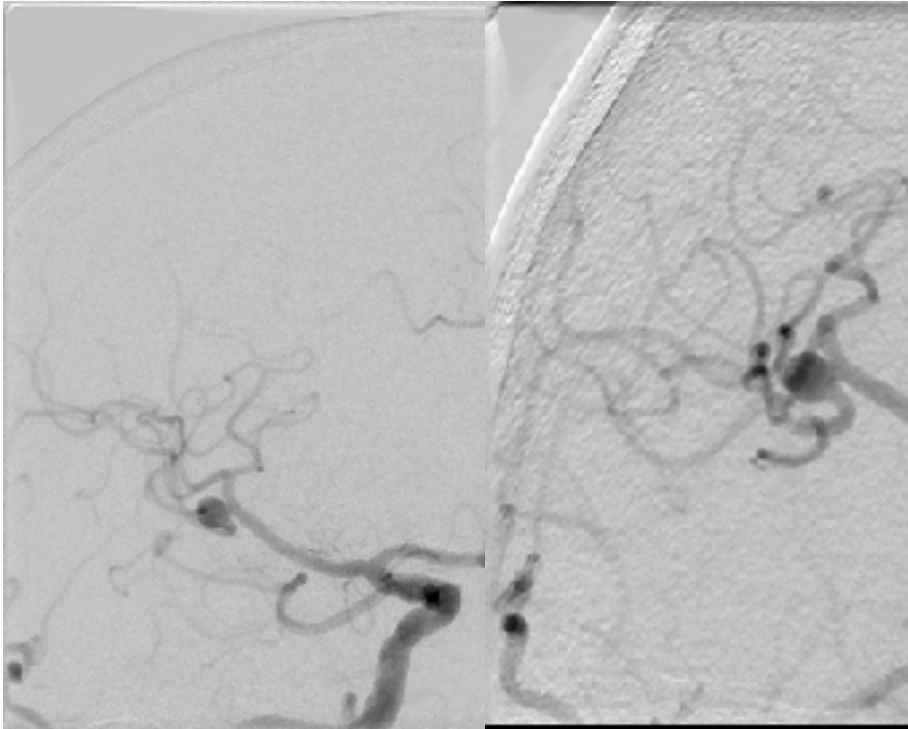
Inoue T et al., J Neurosurg 2012; 117: 20-5

Annual rupture risk of growing unruptured cerebral aneurysms detected by magnetic resonance angiography.

Cerebral aneurysms



Imaging aneurysms



Enlarged image



3D- image



Treatment of aneurysms

International Subarachnoid Aneurysm Trial (ISAT)

Lancet 2002; 360: 1267-74

- Prospective randomized, multi-centric study
- Comparison Coiling vs. Clipping for ruptured aneurysms
- Endpoint: Proportion of patients with Rankin Score 3-6 after 1 year
- Coiling: 23,7 % Rankin 3-6
- Clipping: 30,6 % Rankin 3-6

Coiling of cerebral aneurysms

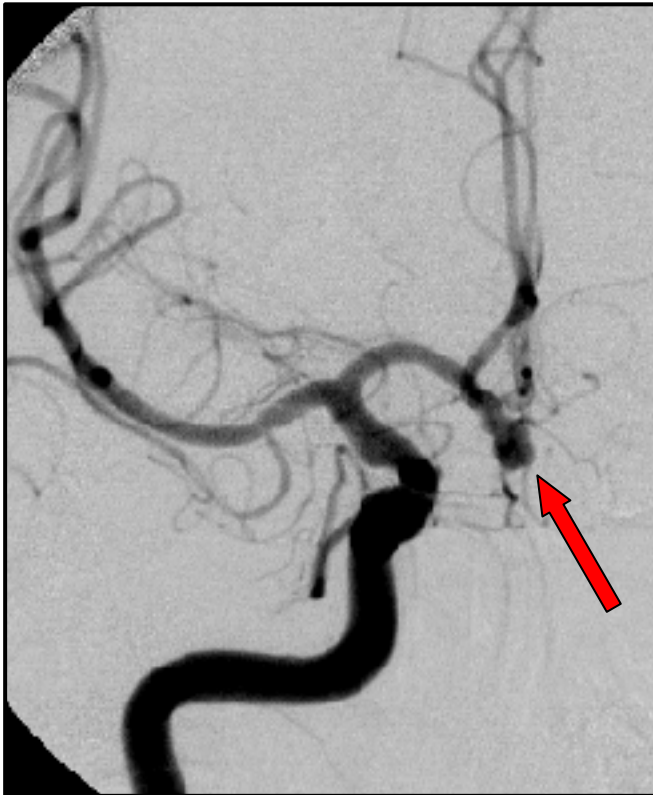
- 1990: Guglielmi detachable Coil (Dr. Guido Guglielmi)
- 1995: FDA approval



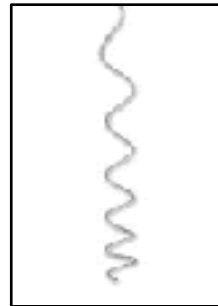
Coiling of cerebral aneurysms



Coiling of cerebral aneurysms



ACI re ap.

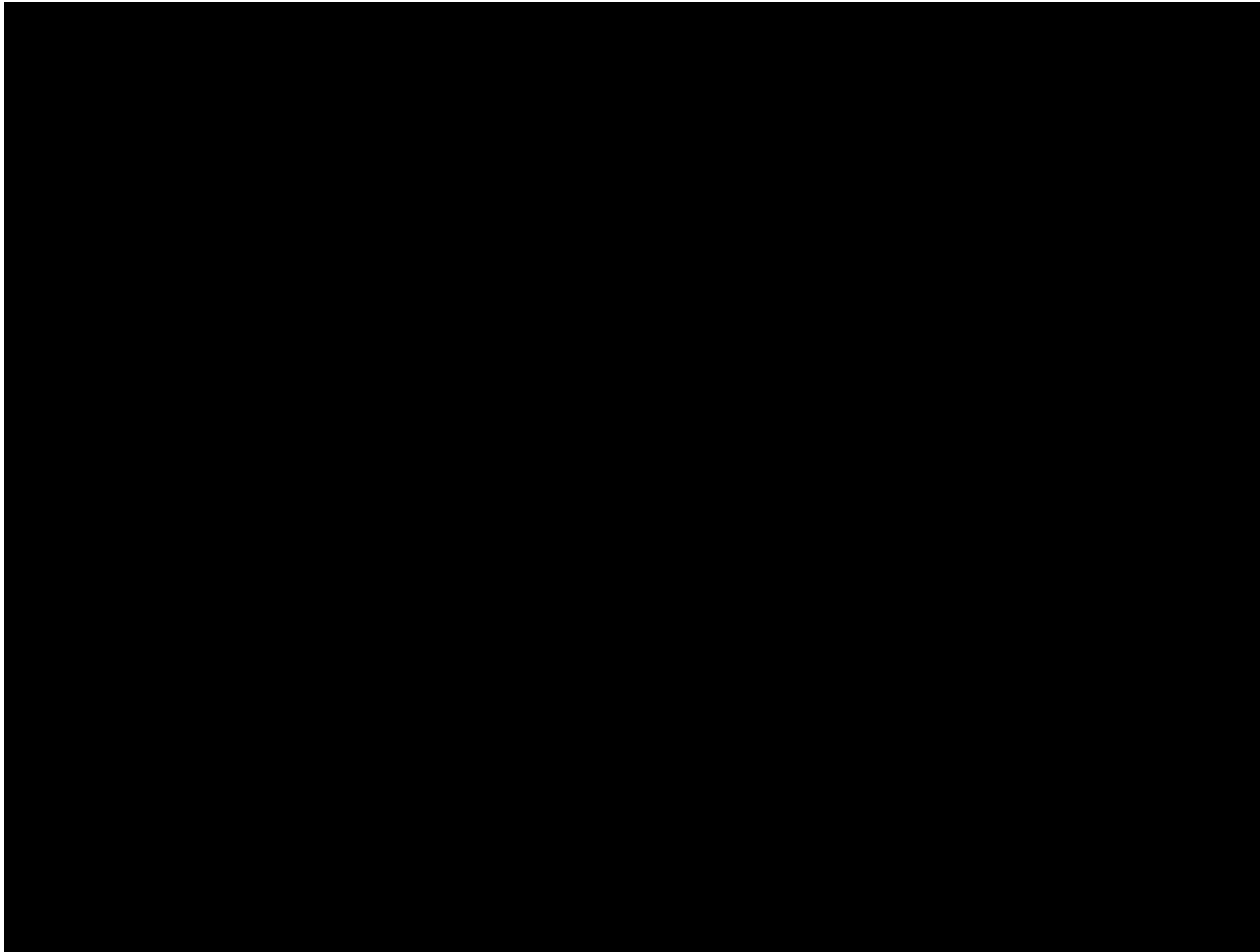


ACI re ap.

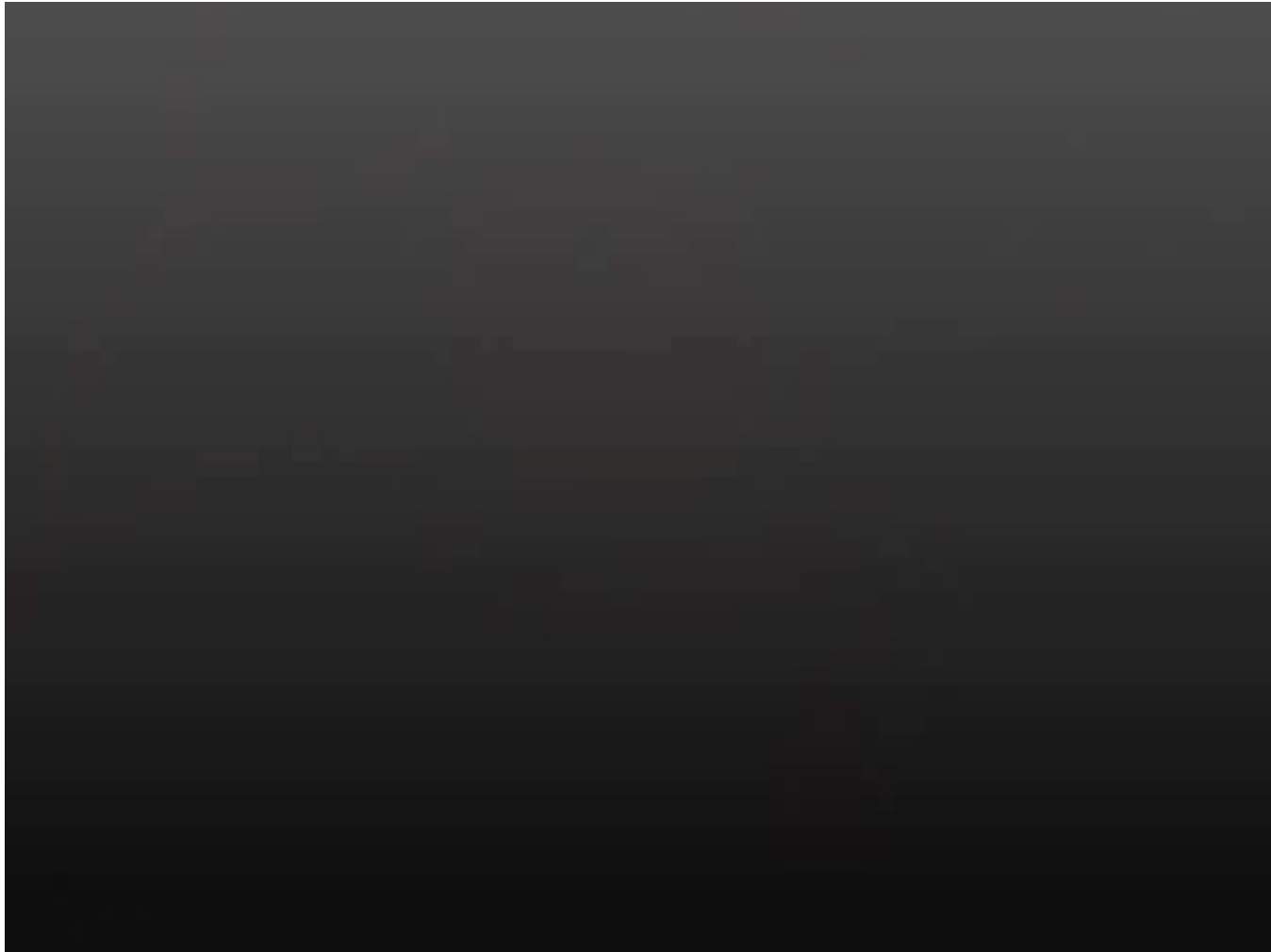
Coiling of cerebral aneurysms



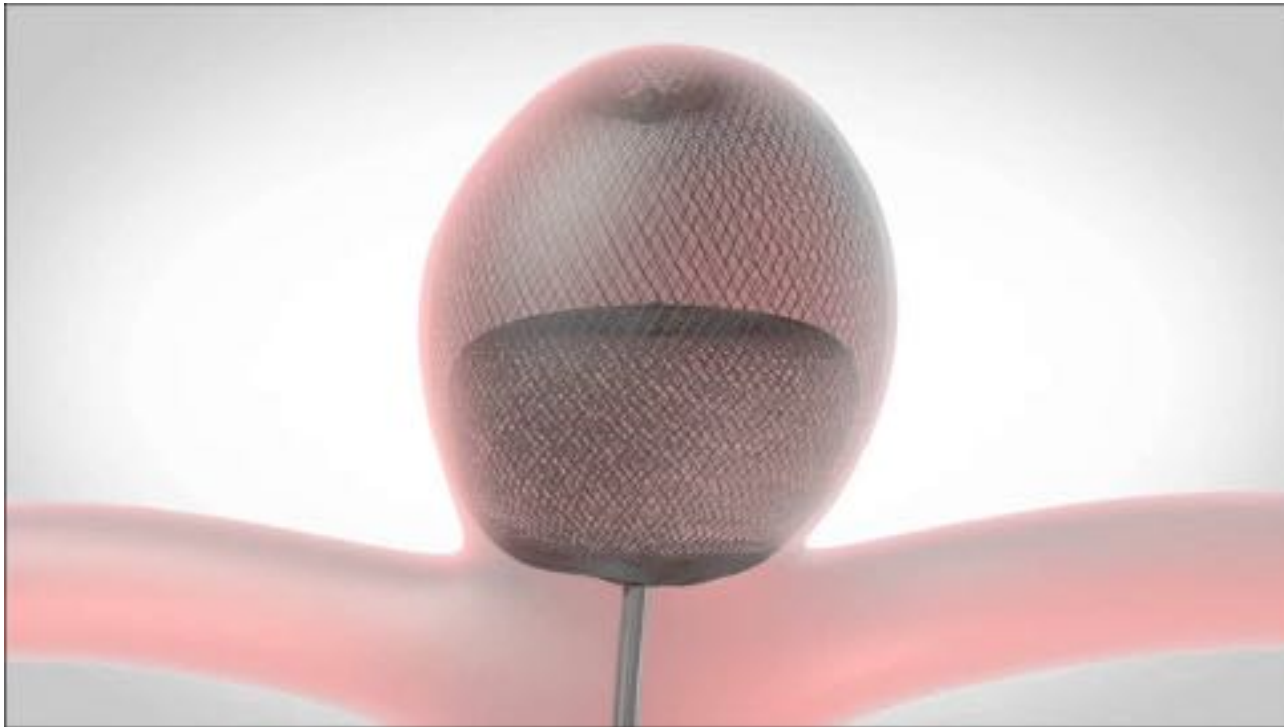
Stent assisted coiling of cerebral aneurysms



Flow diversion of cerebral aneurysms



Intra-aneurysmal flow diverter (WEB)





Intra-aneurysmal flow diverter (WEB)

St. Elisabeth Ziekenhuis

WEB Treatment

Ruptured 4 mm AcomA Aneurysm

Male, 52

Prof. Dr. W.J.J. van Rooij, Dr. J.P.P. Peluso
Tilburg, NL

What is wrong?



Carotid stenosis

Carotid stenosis

- Stenosis >50% in 5% of patients older than 65 years
- men: women 2:1
- Risk for stroke
 - stenosis <50%: <1%
 - stenosis >50%: 1-5%
- **Indication for treatment:**
 - asymptomatic stenosis 60- 99%: consider treatment
 - ***symptomatic stenosis 70- 99%: treat***
 - symptomatic stenosis 50- 69%: consider treatment



Stent Design

- **Ballon expandable stents:** stiff vs.
 - **Self expandable stents:** super-elastic
 - **Material**
 - biocompatibility and corrosion resistance
 - balloon expandable stents: stainless steel and alloys
 - self expandable stents: **Nitinol** (Nickel Titanium Naval Ordnance Laboratory)
 - **Form of raw material:** sheet, wire, tube
 - **Fabrication methods:** coiling, braiding, knitting, **laser cutting**
 - **Geometry:** open cell vs. closed cell
 - **Additions:** pharmaceuticals, radiopacity
-

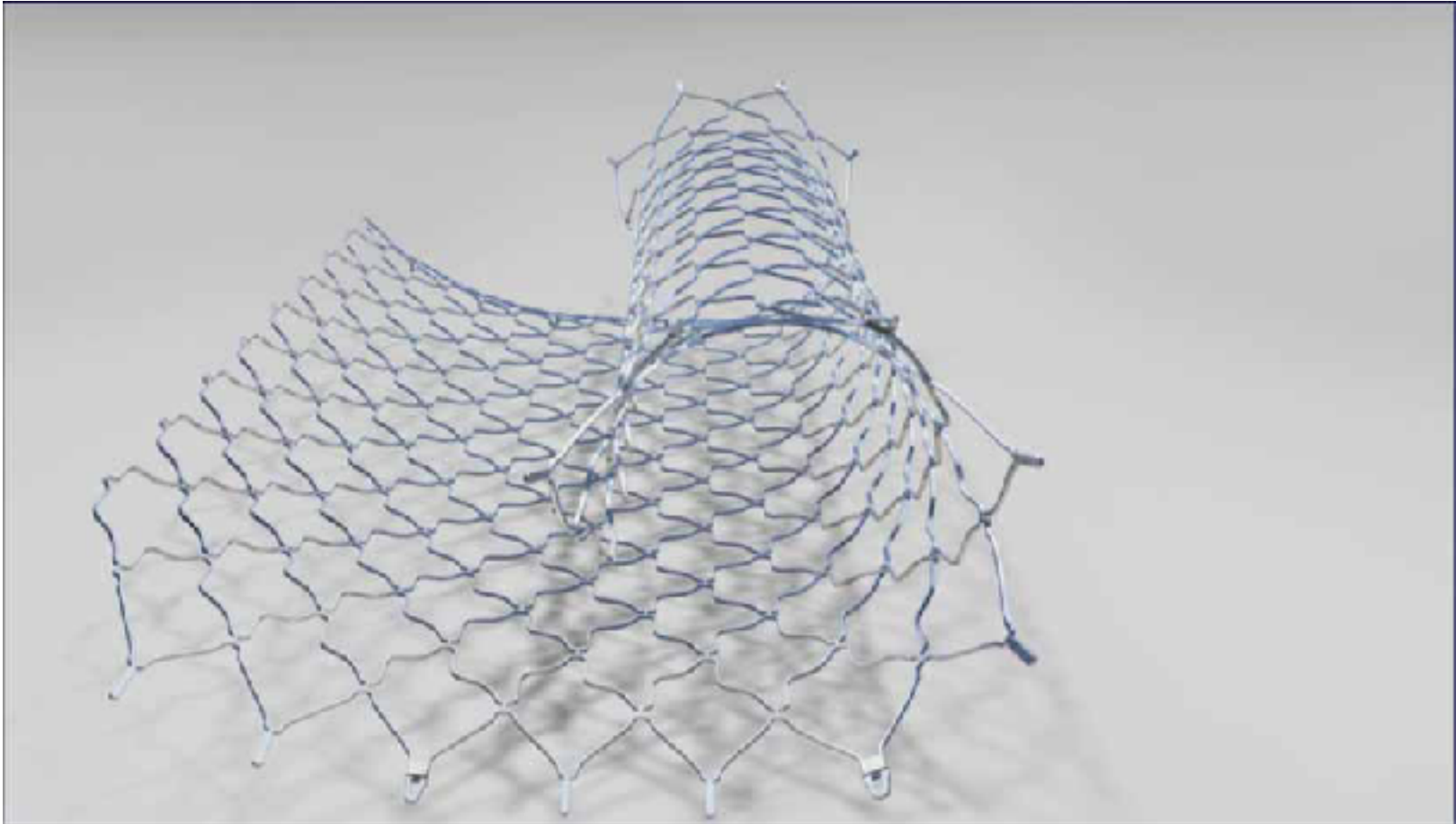
Nitinol

(Nickel Titanium Naval Ordnance Laboratory)



Naval Ordnance Laboratory

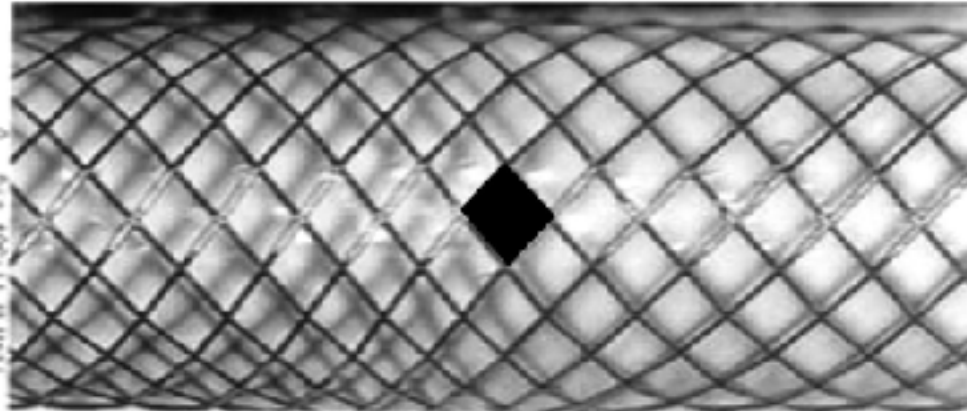
Raw material: Sheet



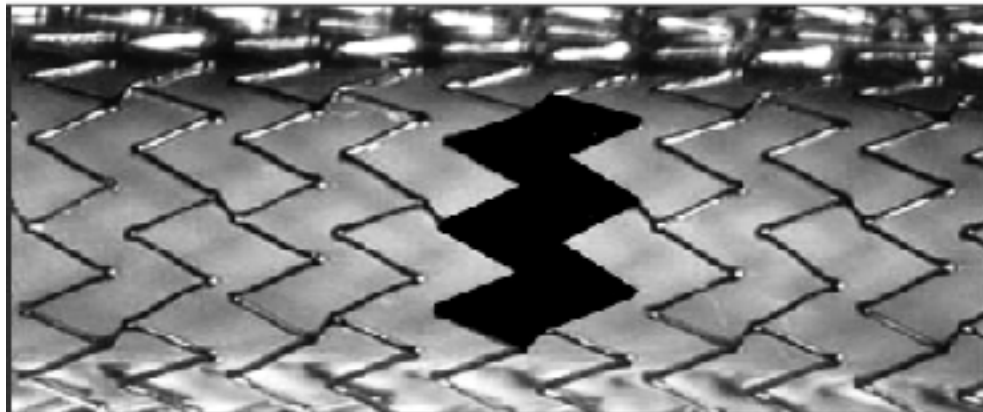
Boston Scientific®

Stent Geometry

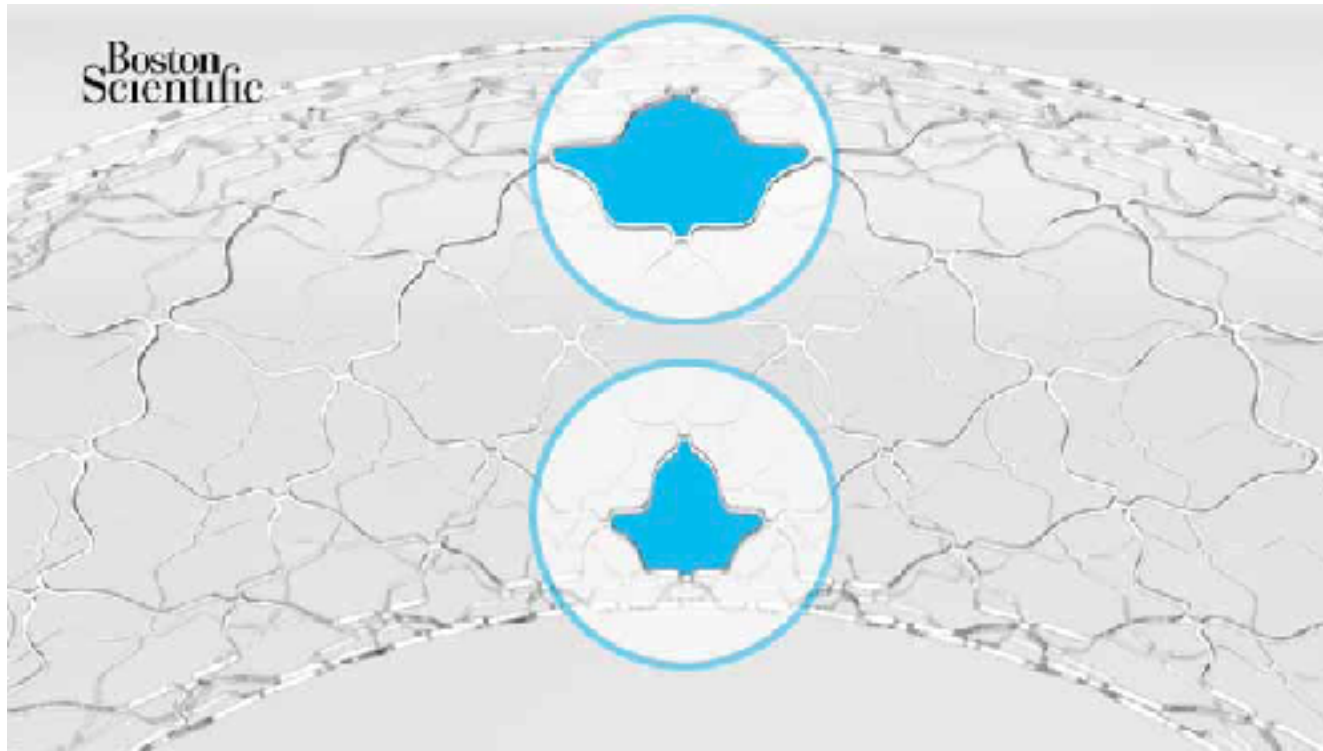
Example of a "closed cell design stent": free cell area is marked black



Example of an "open cell design stent": free cell area is marked black

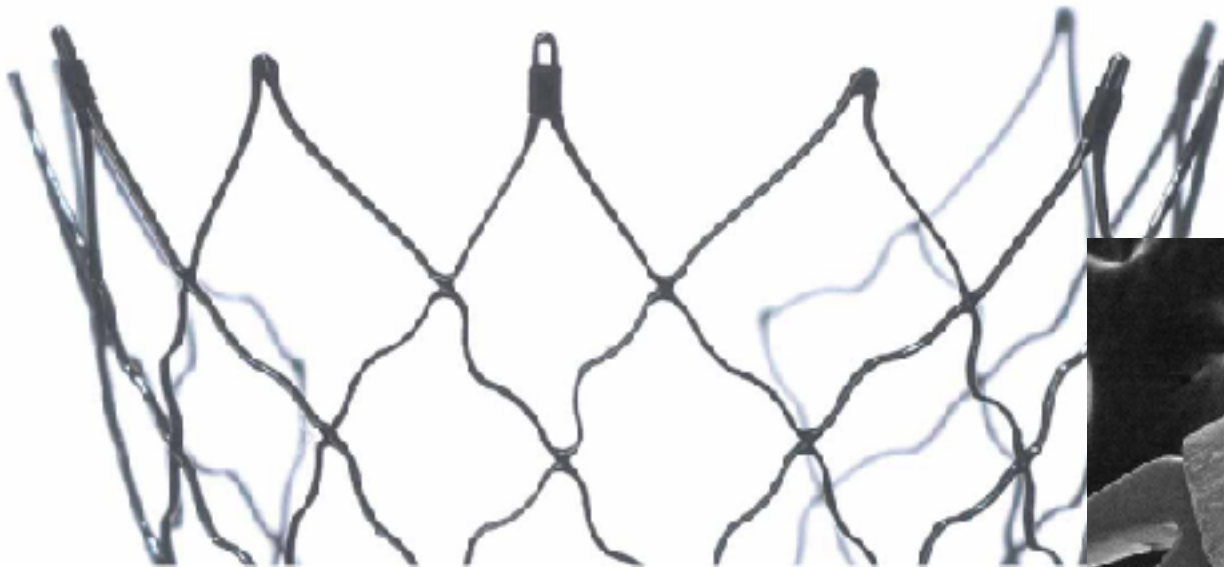


Stent Geometry

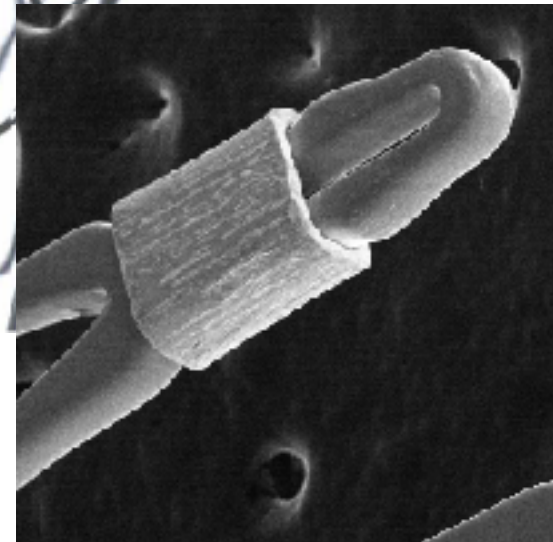


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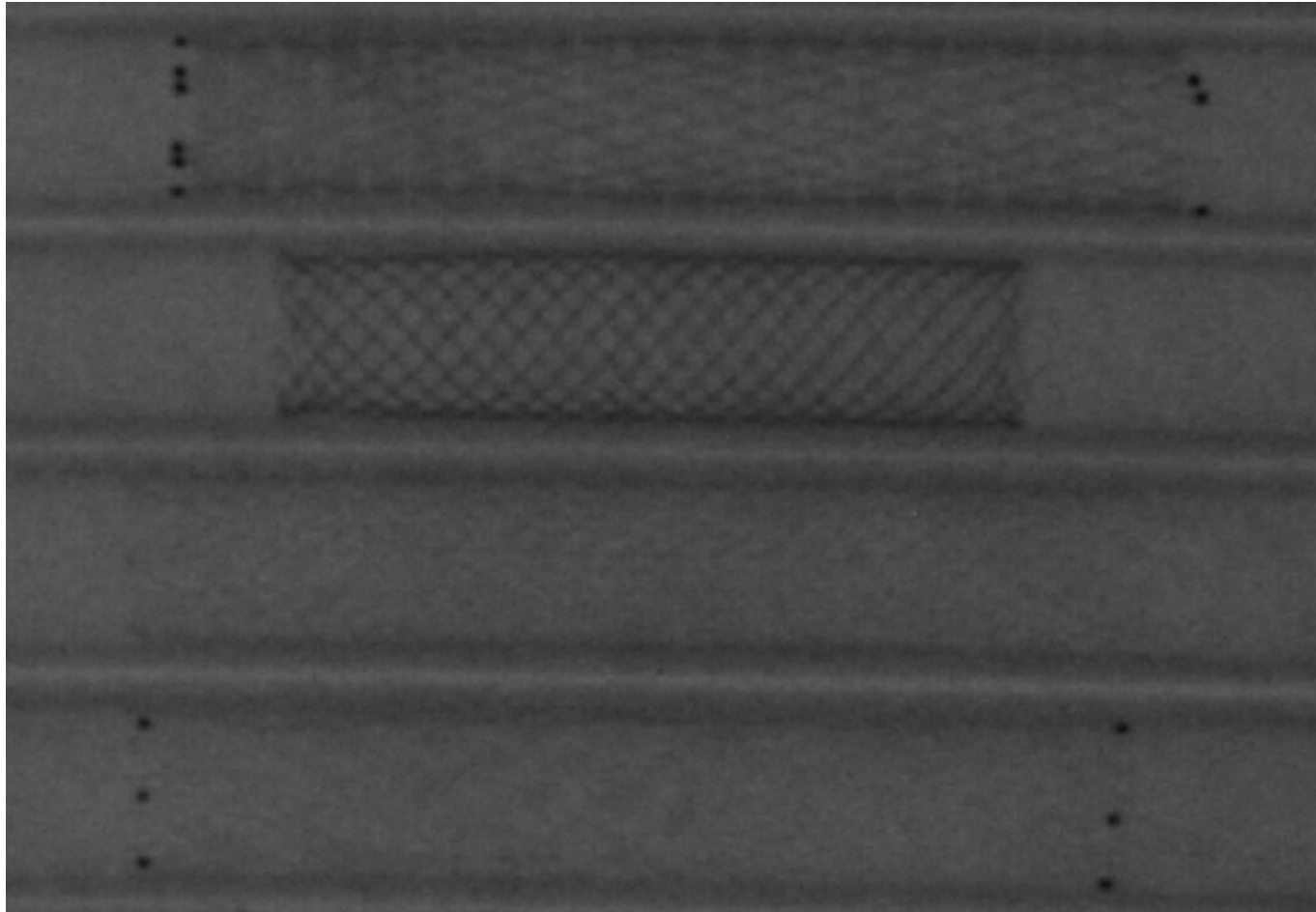
Additions: Radiopaque Markers



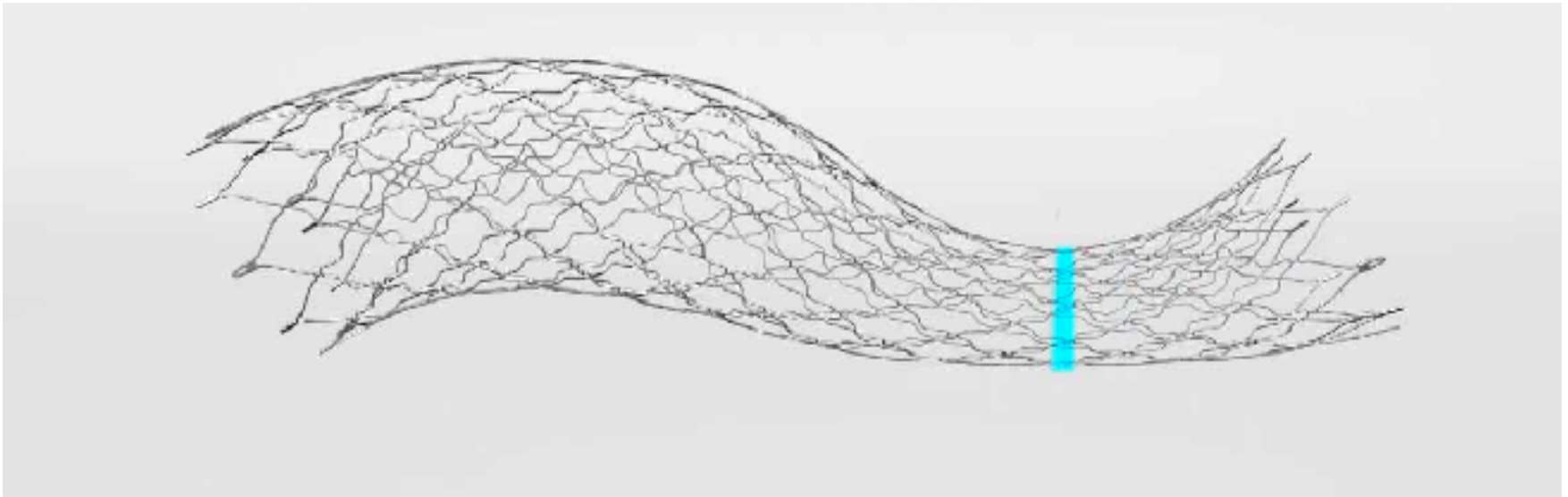
Tantalum markers



Additions: Radiopaque Markers

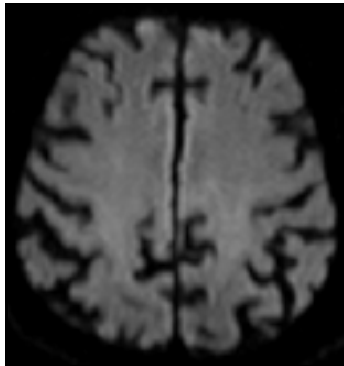


Tapering

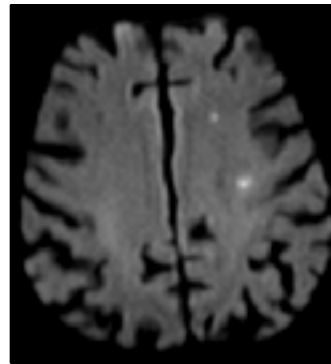
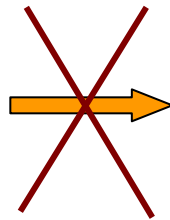


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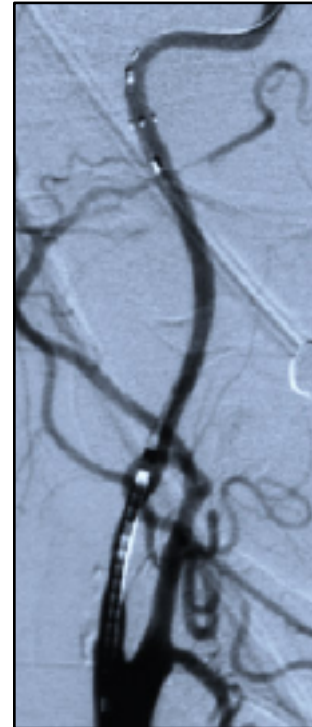
Neuroprotection



DWI prä



DWI post

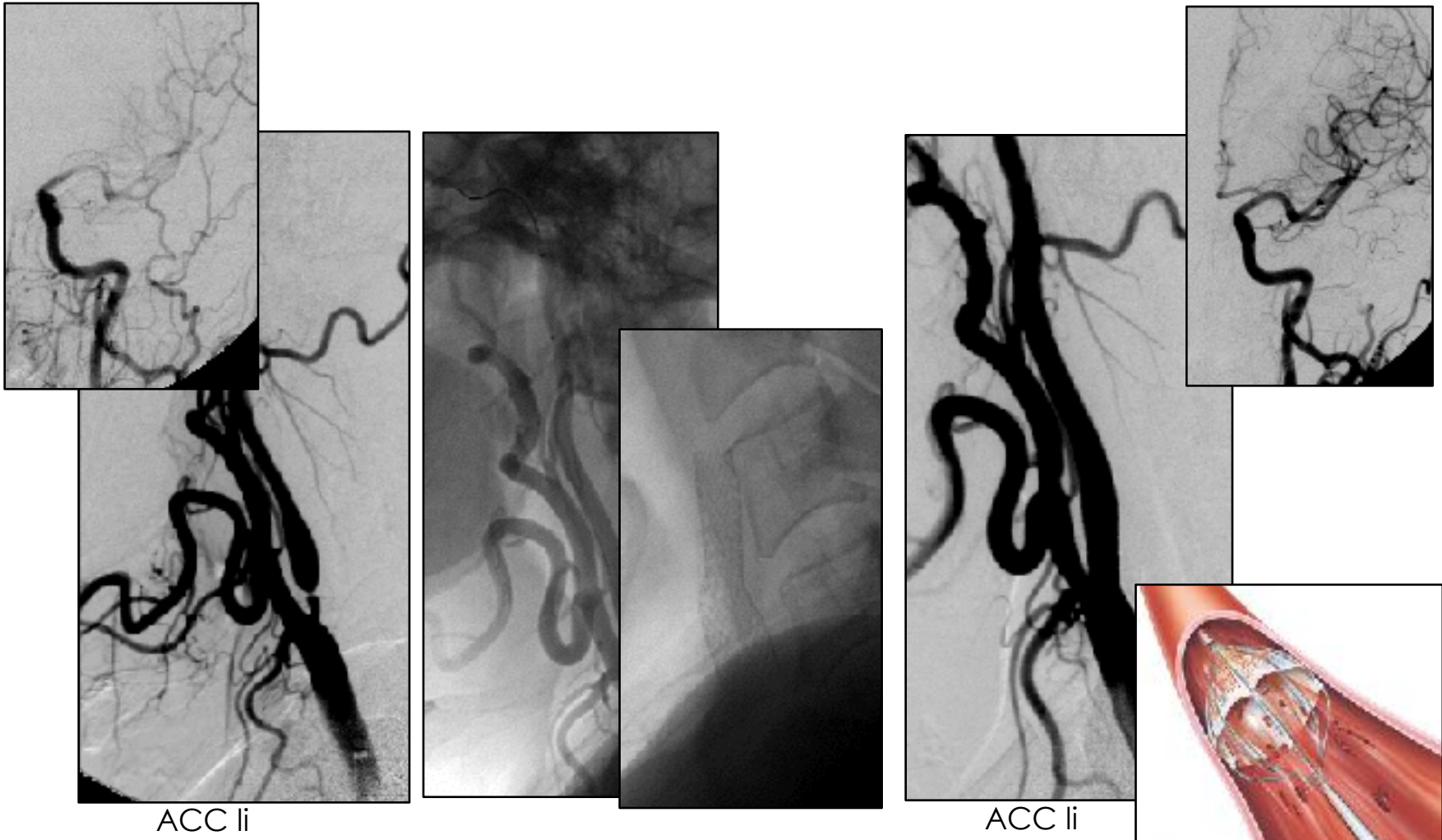


ACC re ap.



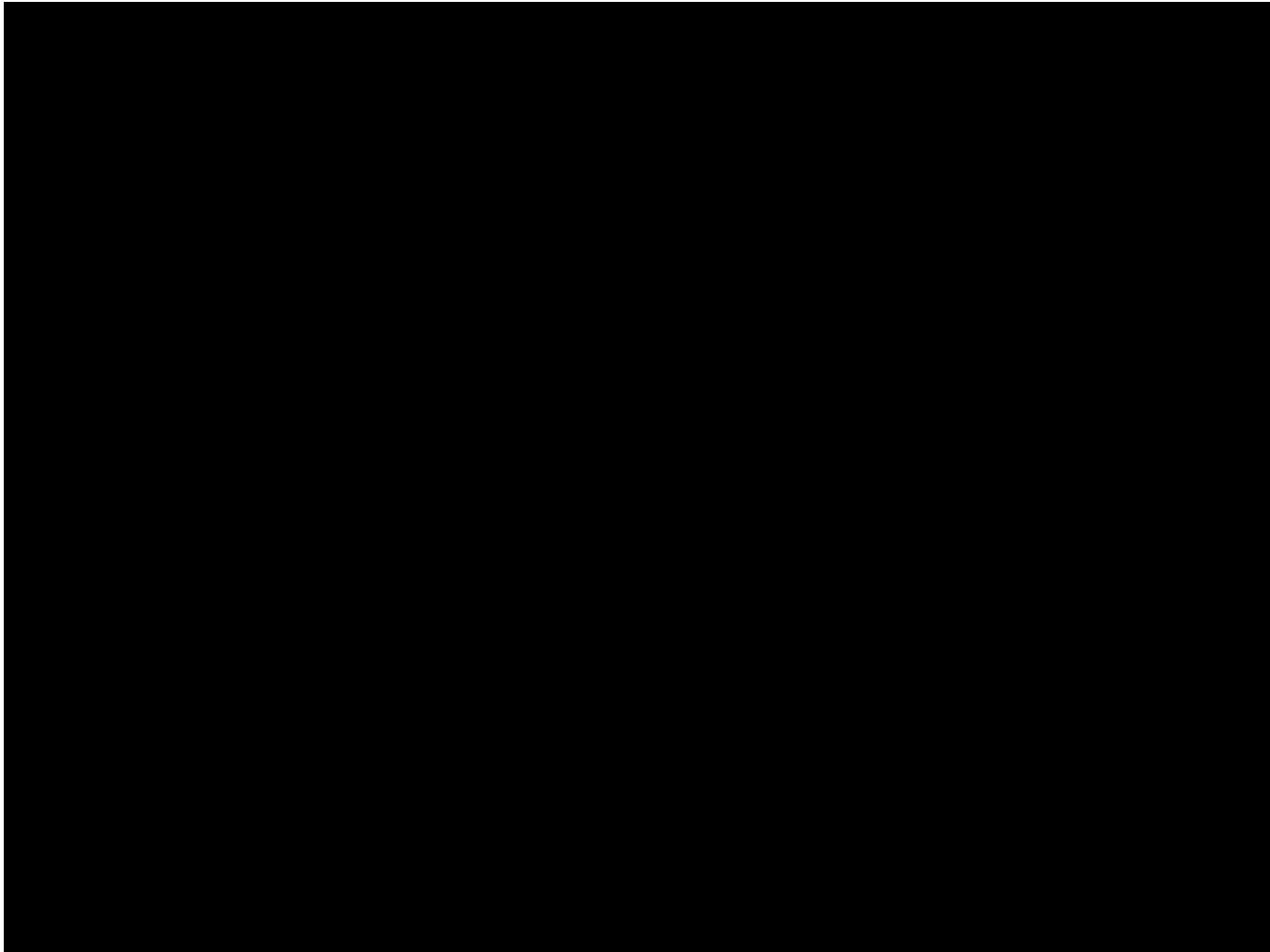
ACC li ap.

Carotid Stenting

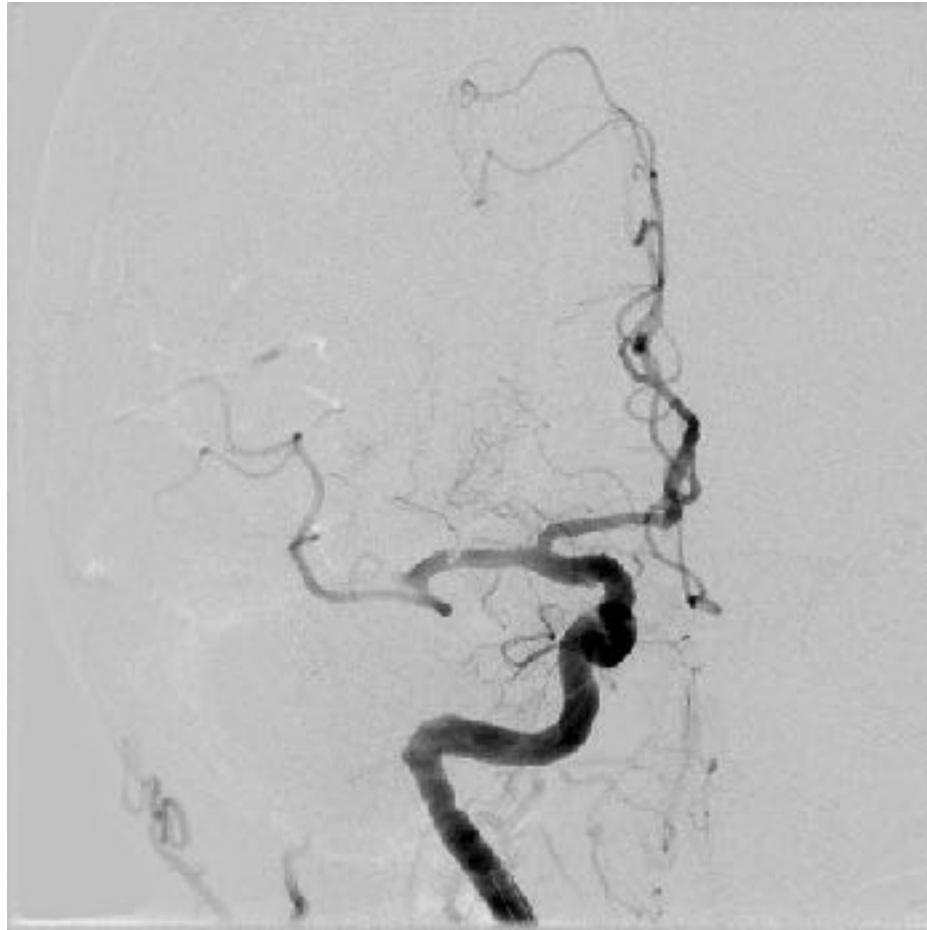




Carotid Stenting



What is wrong?



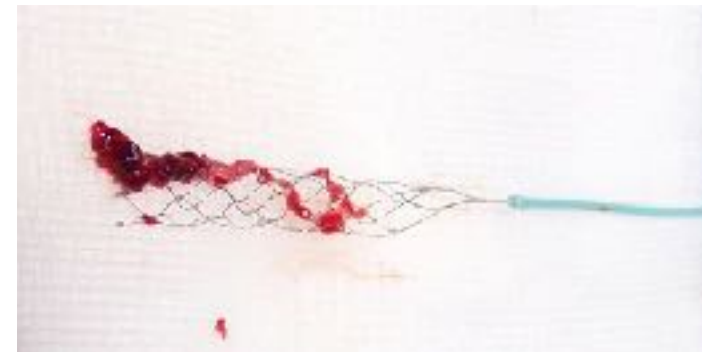
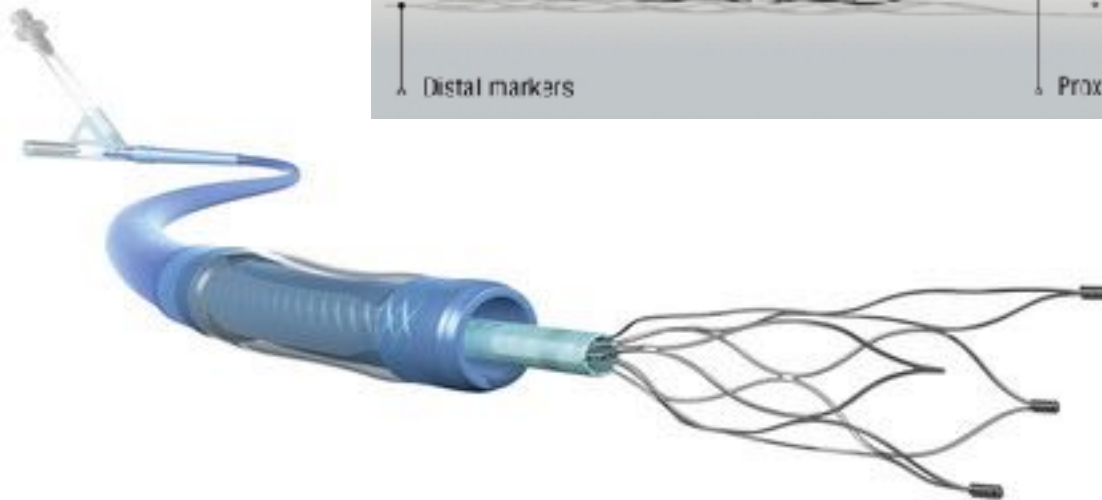
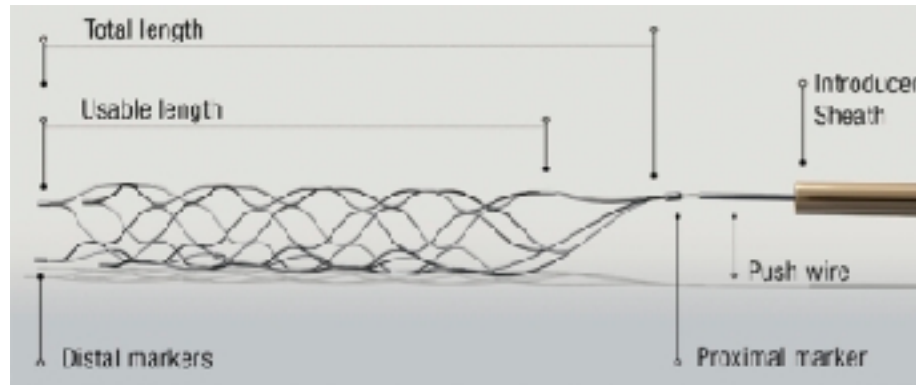
Middle cerebral artery occlusion



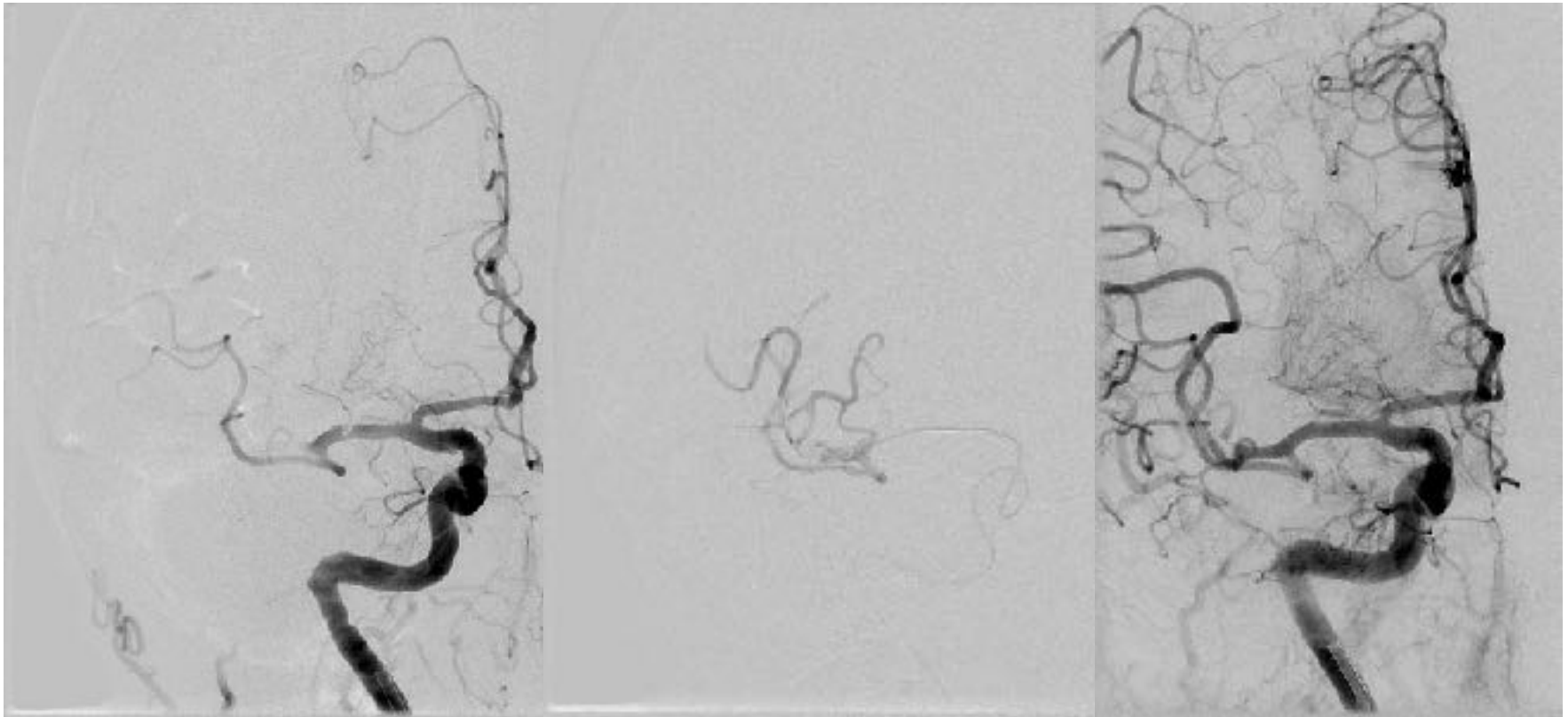
Stroke

- **85% ischemic (embolic)** and 15% hemorrhagic
- *Within 4,5 h after symptom onset* **intravenous thrombolysis (IVT) possible and save**
- **But** IVT is not effective in thrombus length >8mm
- Solution: **Mechanical recanalization** within 7.3 hours useful
- And **,Time is Brain‘** - as fast as possible

Solitaire Stent Retriever



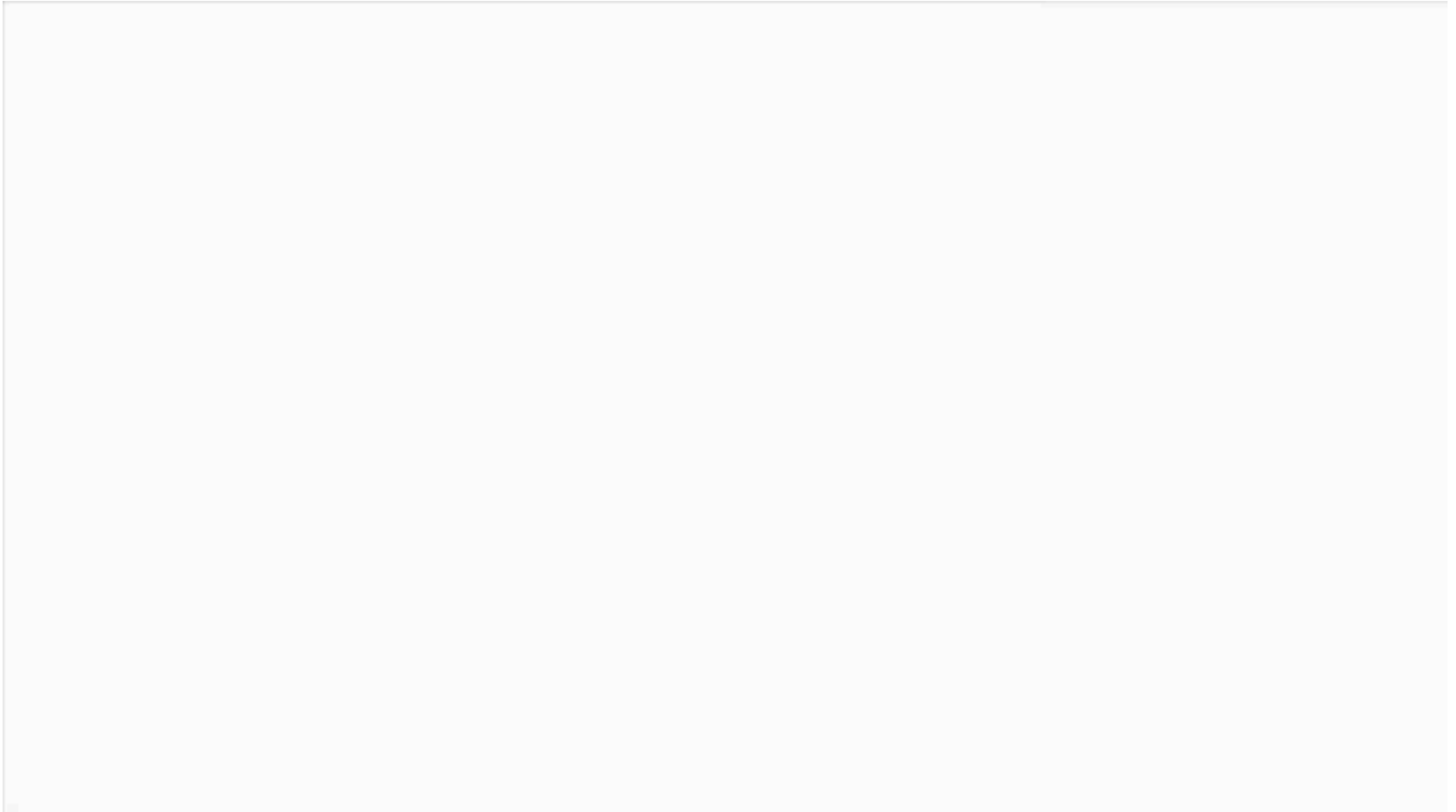
Ischemic Stroke



Mechanic recanalization of proximal artery occlusion



Cerebral Revascularisation



Cerebral Revascularisation

