Intracranial Aneurysms Update 2023

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SENTARA NEUROSURGERY

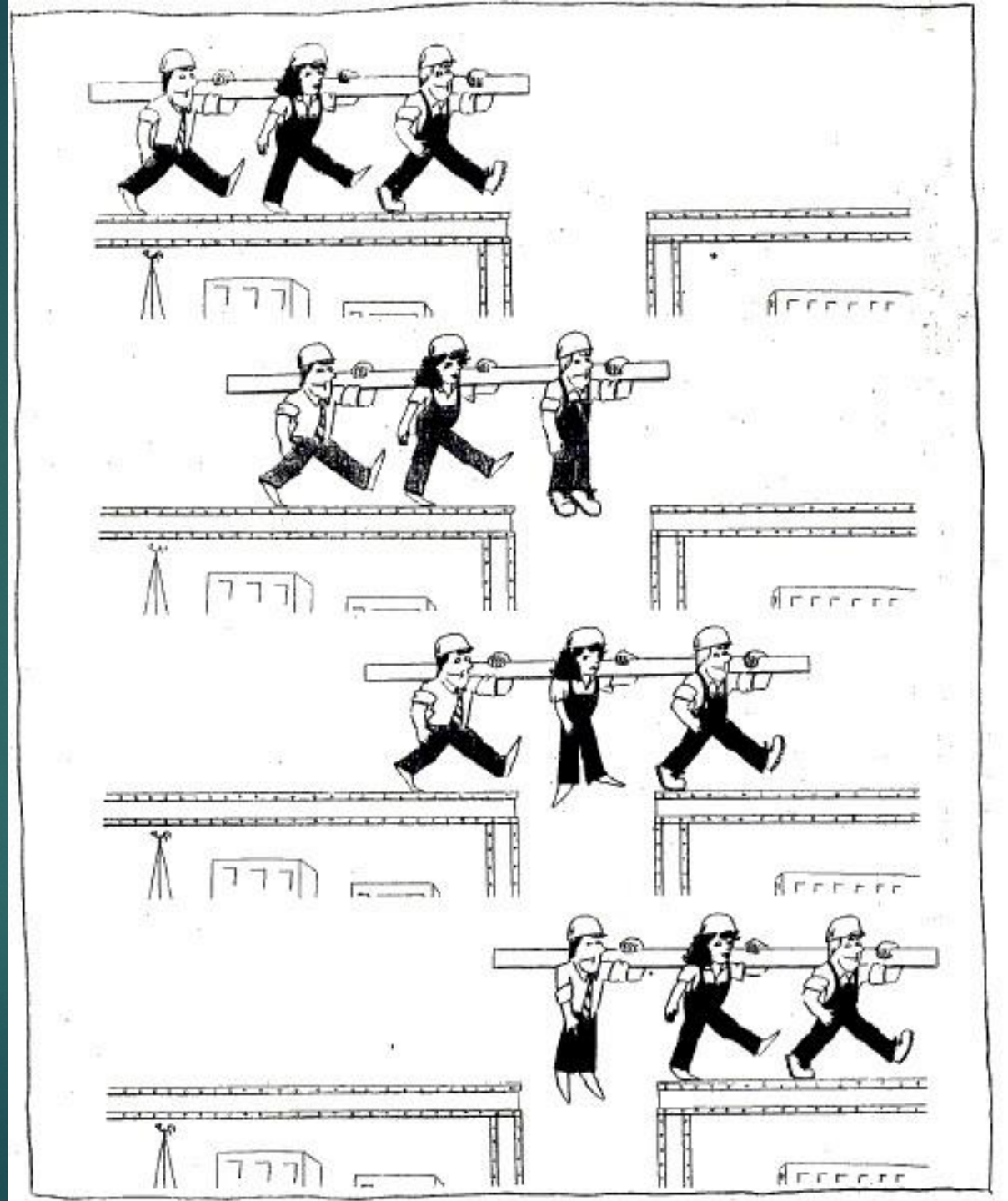
Disclosure

- None

Teamwork is the Key to Success

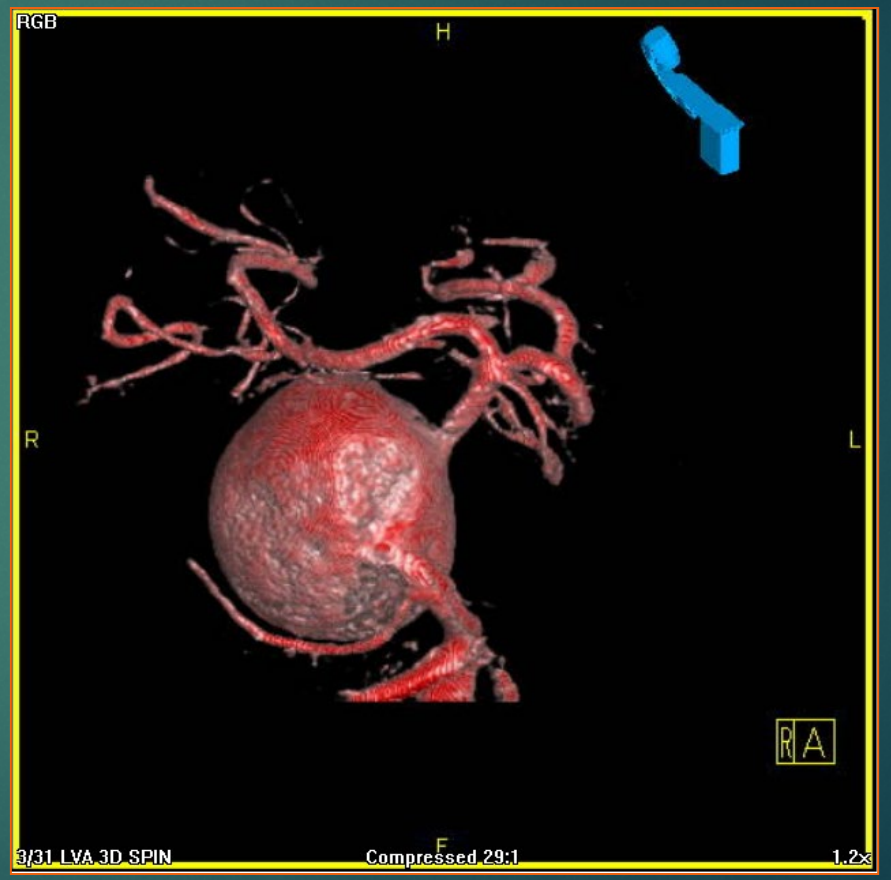
Need to select the best treatment based on the patient and the aneurysm

One size doesn't fit all



Intracranial Aneurysms

- Devastating disease
  - 60% mortality when rupture occurs
- About 40,000 patients treated yearly in the US
- Options
  - Observation
  - Open Clipping
  - Endovascular treatment
- Typical Treatment Threshold
  - Size > 5-7mm
  - Anatomic irregularity (daughter sac or nipple)



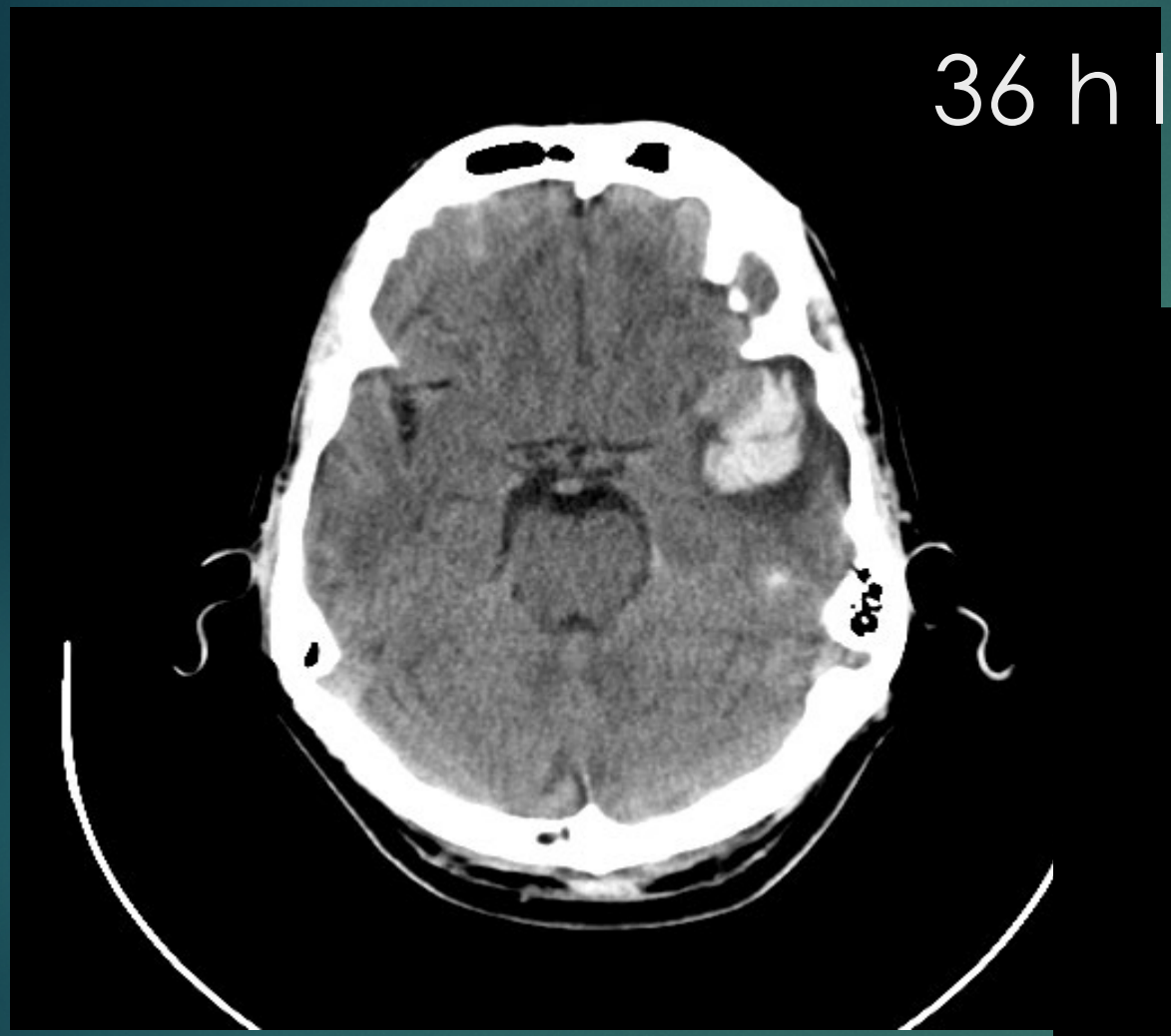
Causes of Morbidity and Mortality

- BLEEDING
- Rebleeding
- Rebleeding
- Hydrocephalus
- Ischemia
- Vasospasm
- Electrolyte imbalance
- SAH induced cardiac dysfunction
- Etc.

Preventing Aneurysm Rebleeding

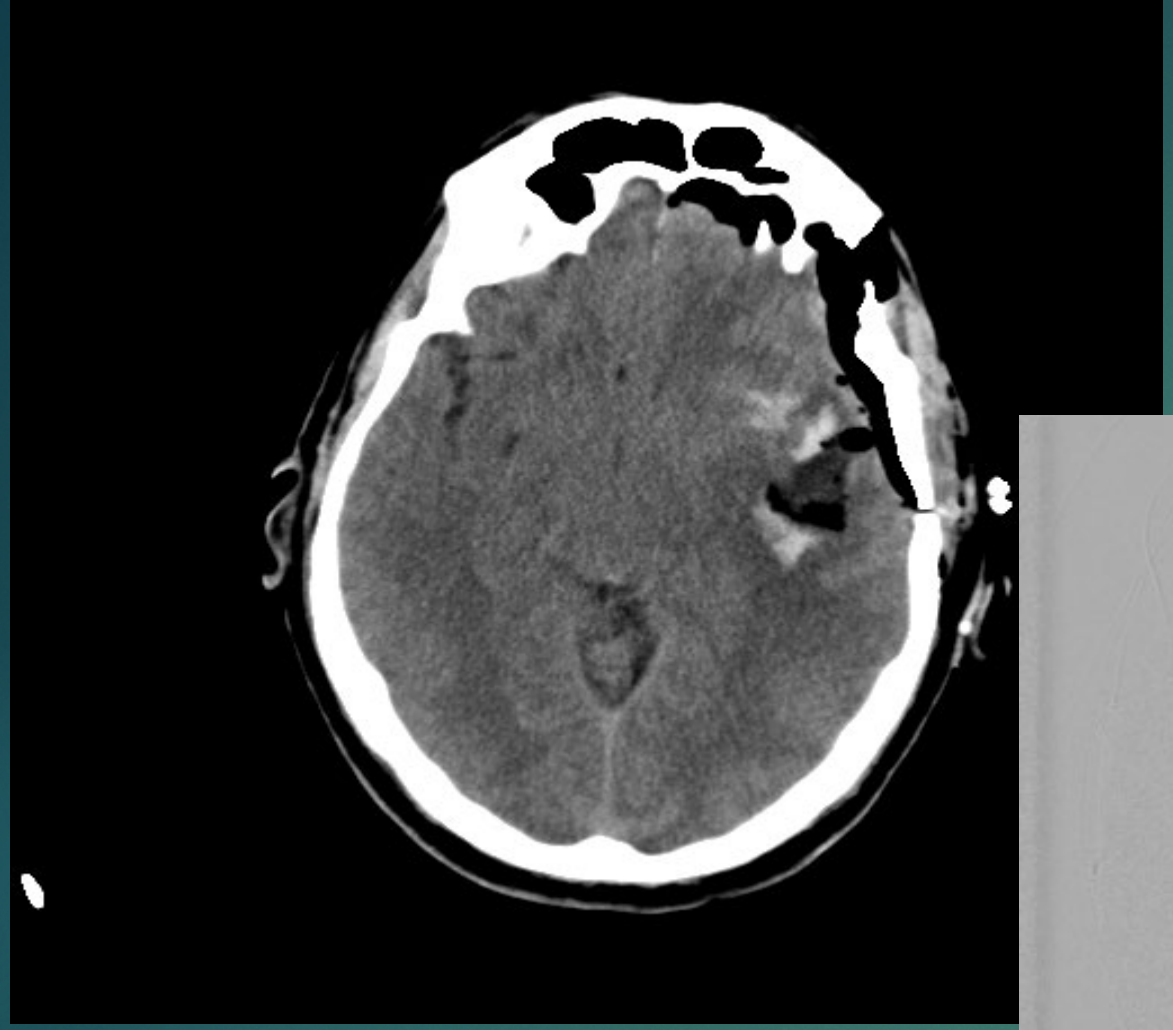
- Calm environment
- Pain management
- If patient intubated, continuous sedation
  - Muscle relaxant if needed
- SBP <140
- Use of anti-fybrinolytic agents

Case 1



36 h later

The Bleed



ED Evaluation of SAH

- 50% of patients with SAH have warning symptoms
- CT Head
  - LP if CT negative with Thunderclap headache
- CTA Head and Neck
  - CTA will guide modality of treatment
  - If CTA negative
    - Catheter based angiography

ED Management of SAH

- ABCs
- BP Target varies
  - Clinical situation
  - IPH
- Avoid maneuvers can induce rebleeding
- Comatose patients assume elevated ICP
  - EVD
  - Mannitol
  - Hypertonic saline

Intracranial Aneurysms

- Craniotomy for aneurysm clipping had been the standard treatment for aneurysms for decades
- 2004: The year where coiling surpassed clipping in the US and currently endovascular is the primary treatment choice at many institutions including at Sentara
- The use of stents and flow diverters has allowed us to treat many more patients with complex aneurysms using endovascular techniques with fewer complications
- There remain some limitations with endovascular treatment in the setting of ruptured aneurysms especially with stents and flow diverters given the need for DAP

Surgical Morbidity

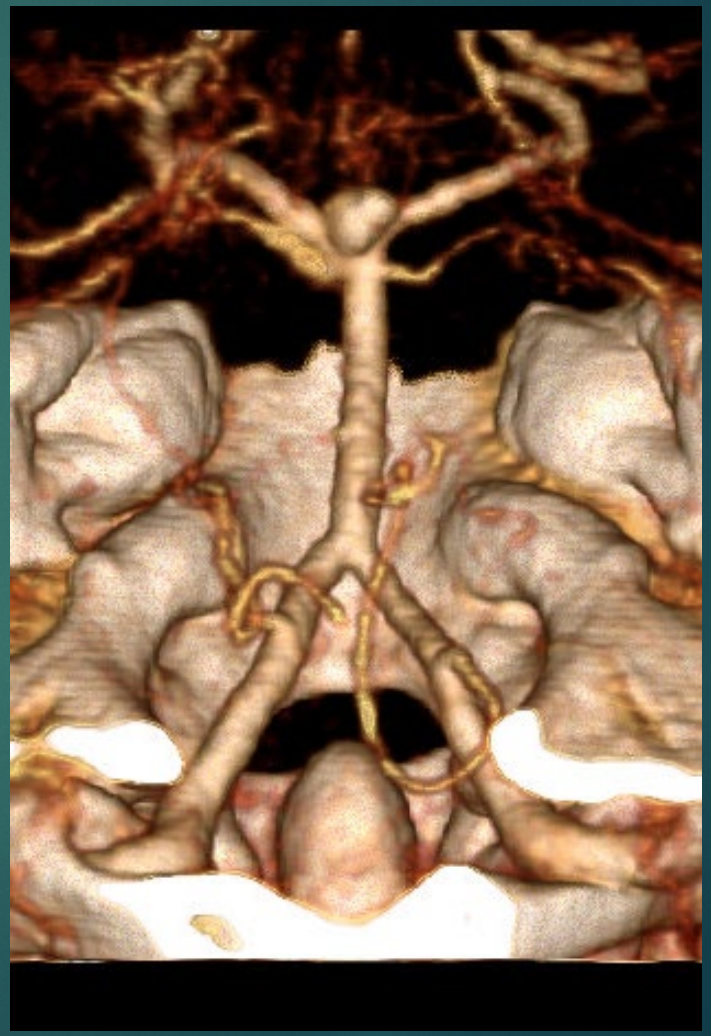
Favors Endovascular Treatment

Efficacy/Durability

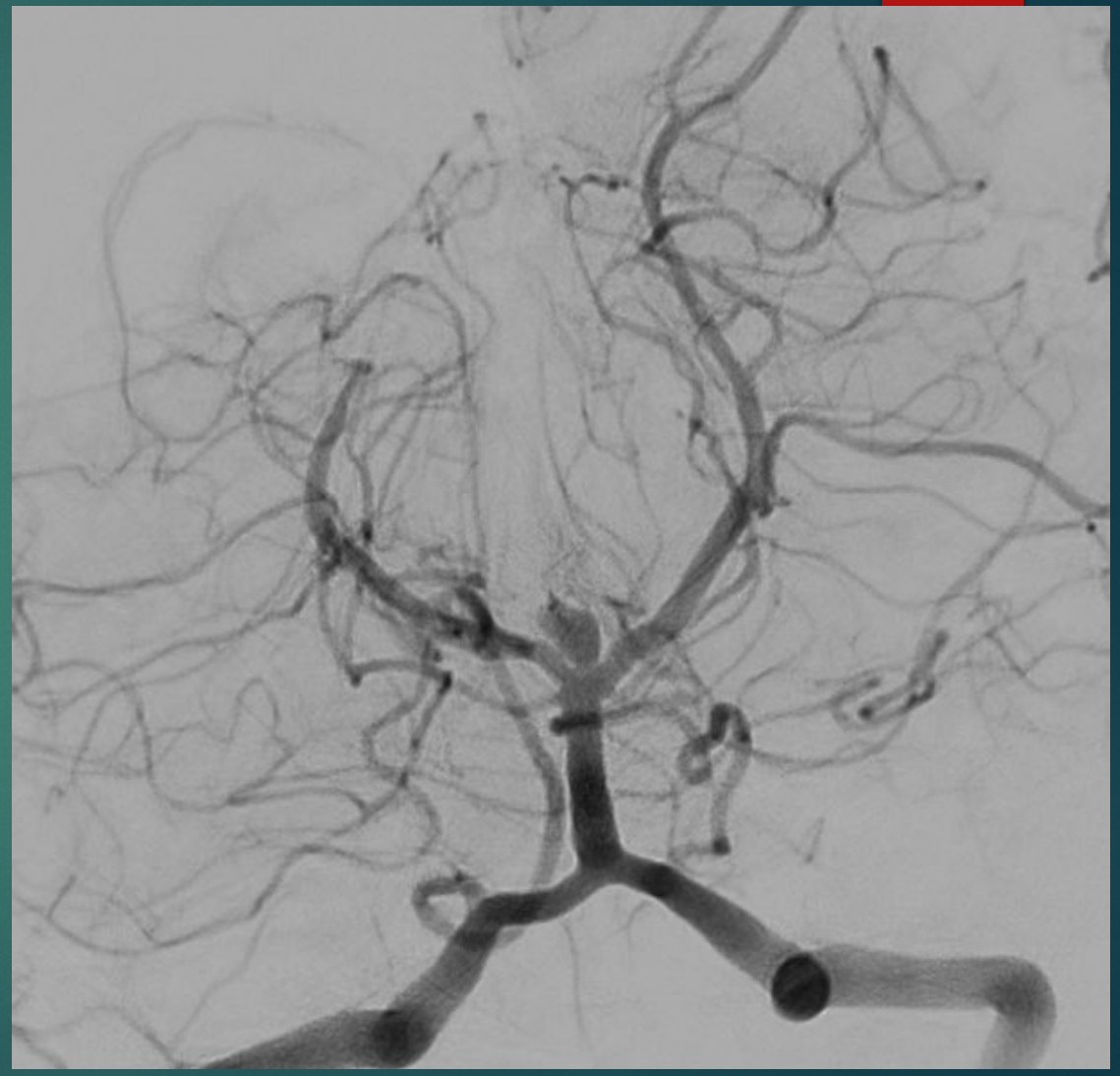
- Favors Open Surgical Treatment
- Endovascular treatment continues to improve rapidly especially in the setting of flow diverters

CASE 2

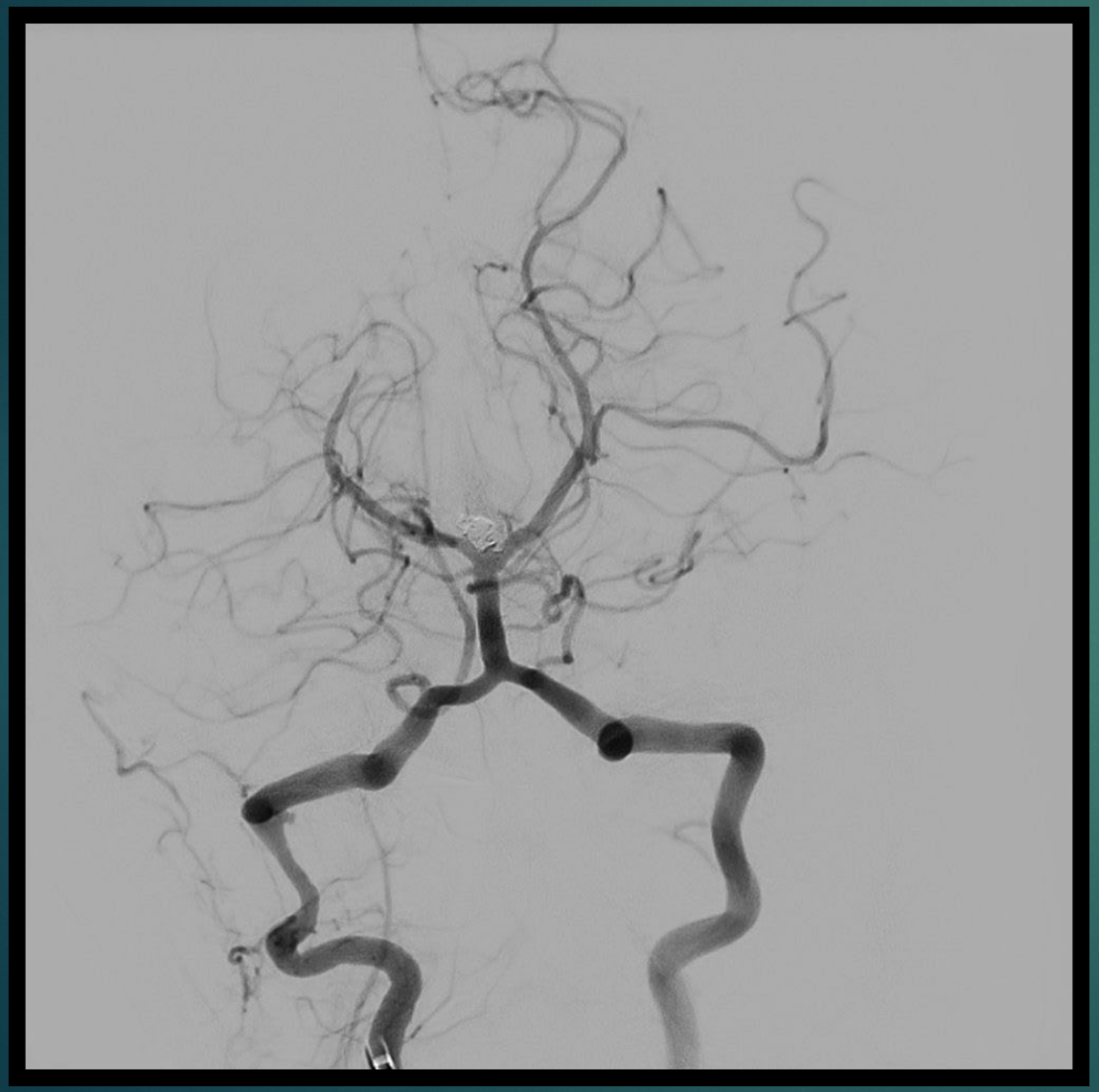
30 YO Female with Coital HA
Low volume SAH



DSA



Primary Coil Embolization



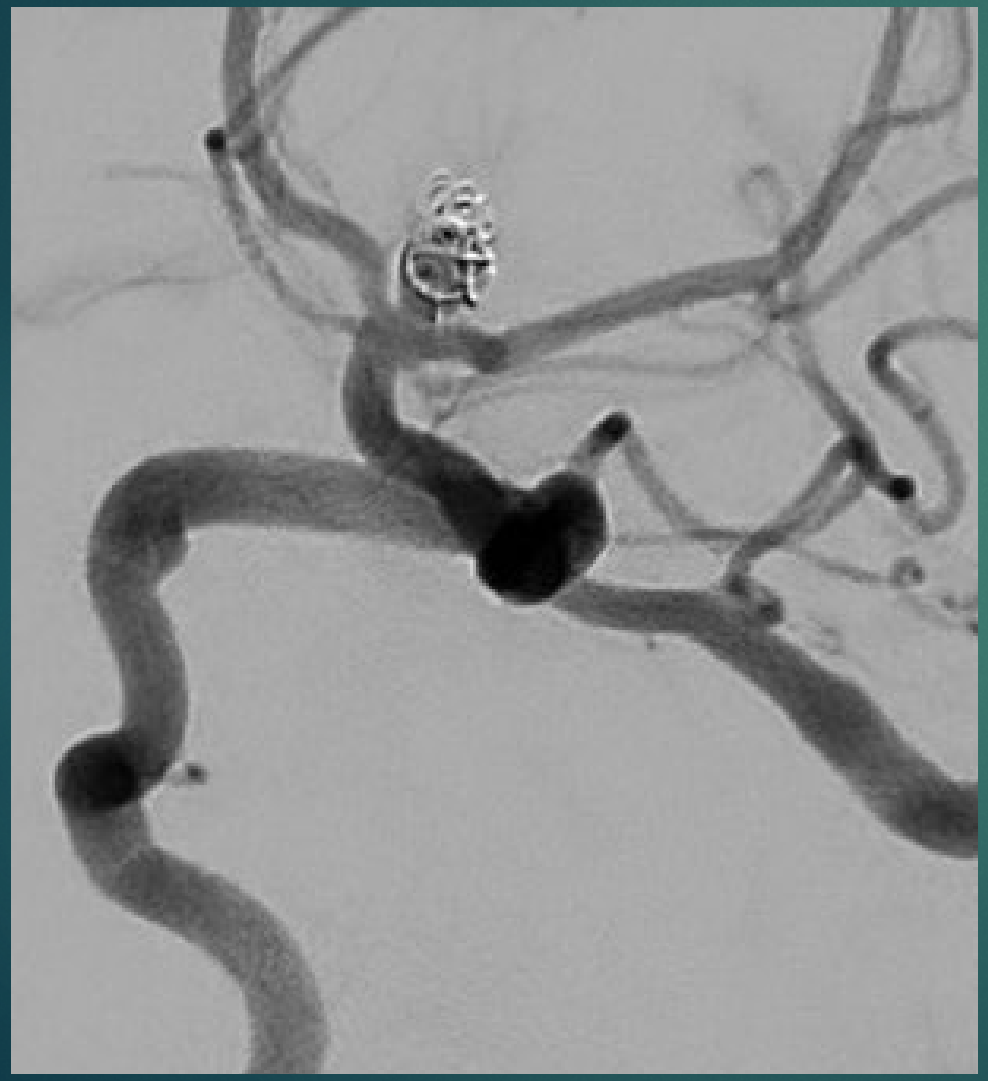
6 Month follow-up with recurrence

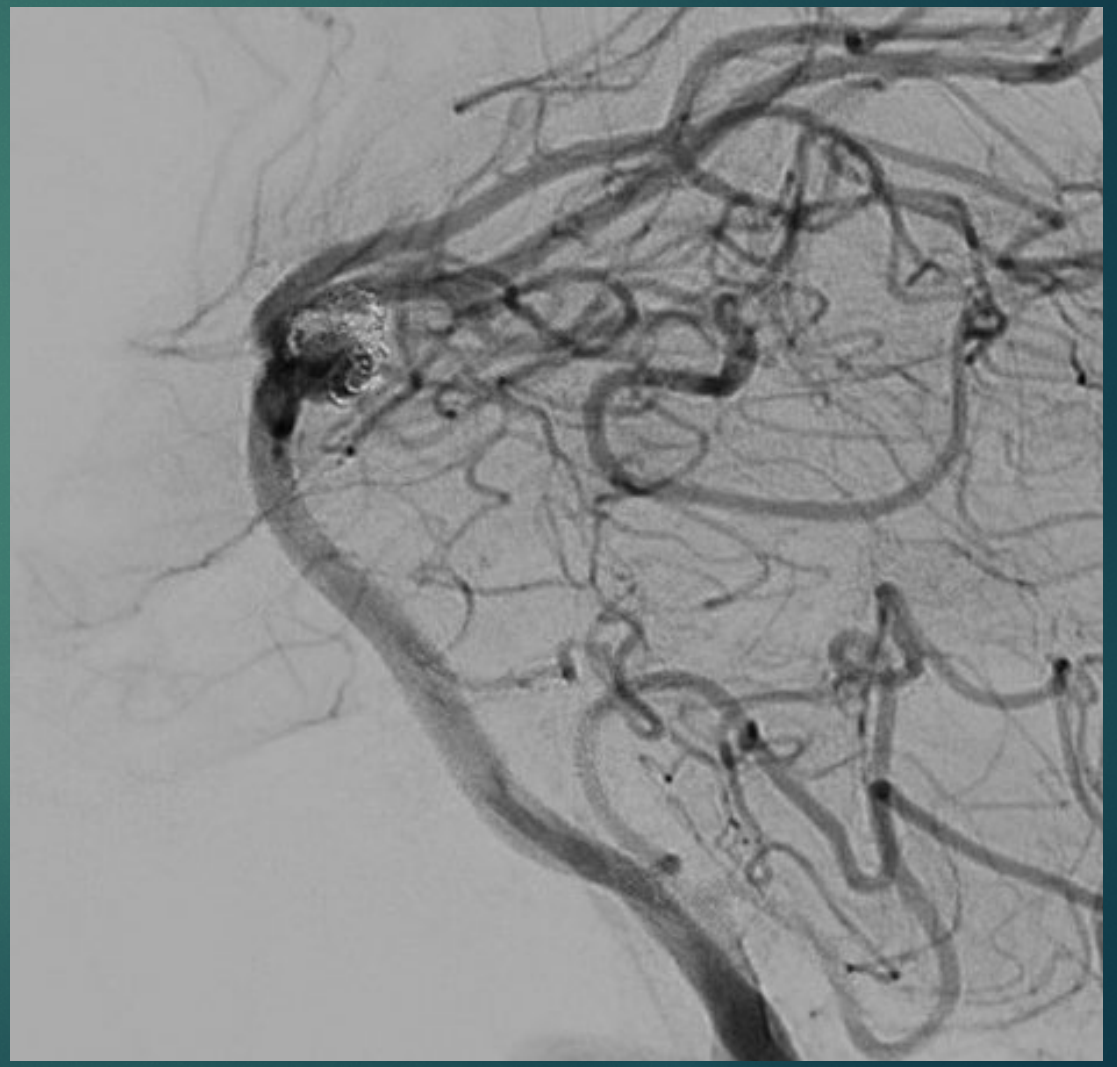
Initial treatment LAT Post

AP 6Mo MRA

6 Mo LAT with Coil compaction

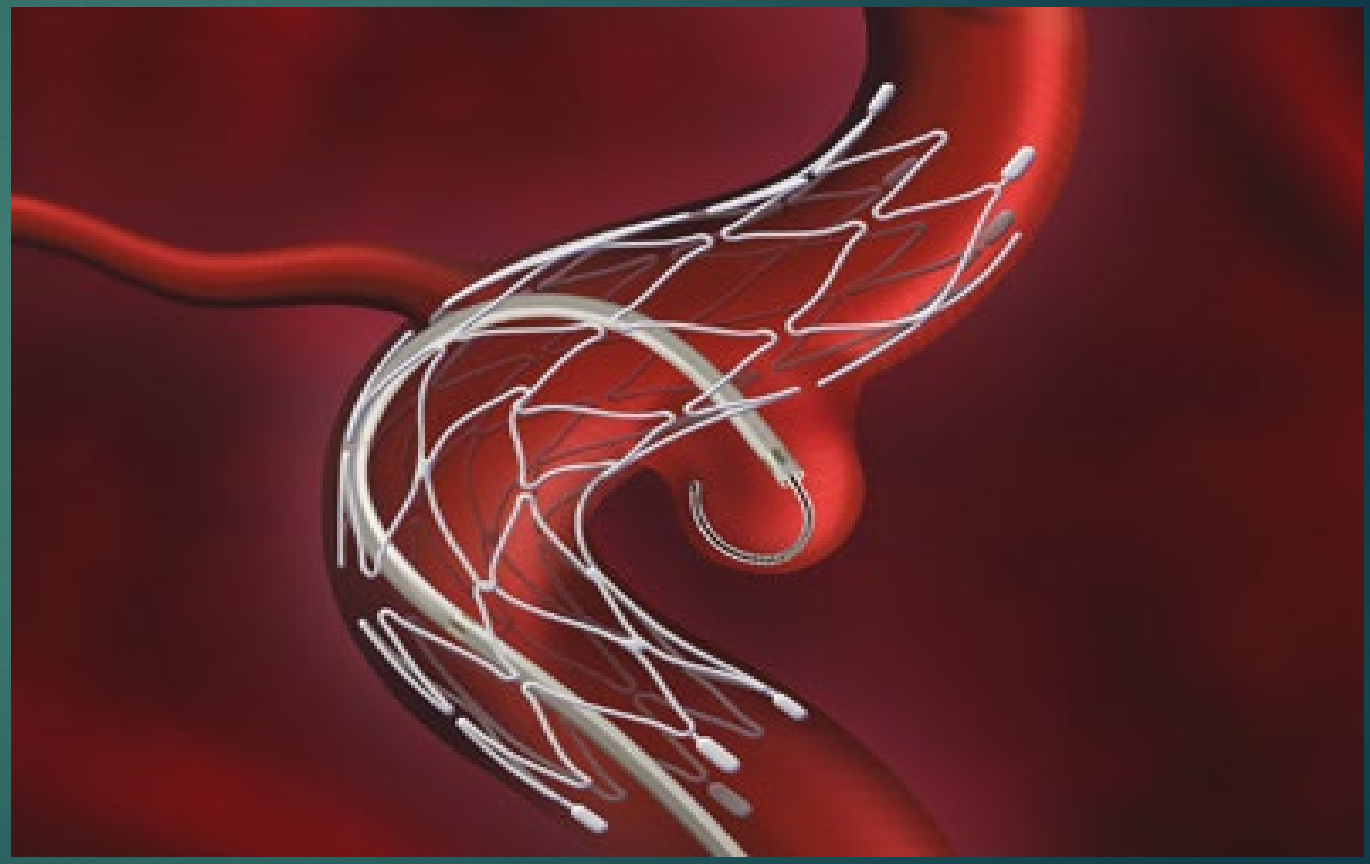
Significant recurrence from coil compaction

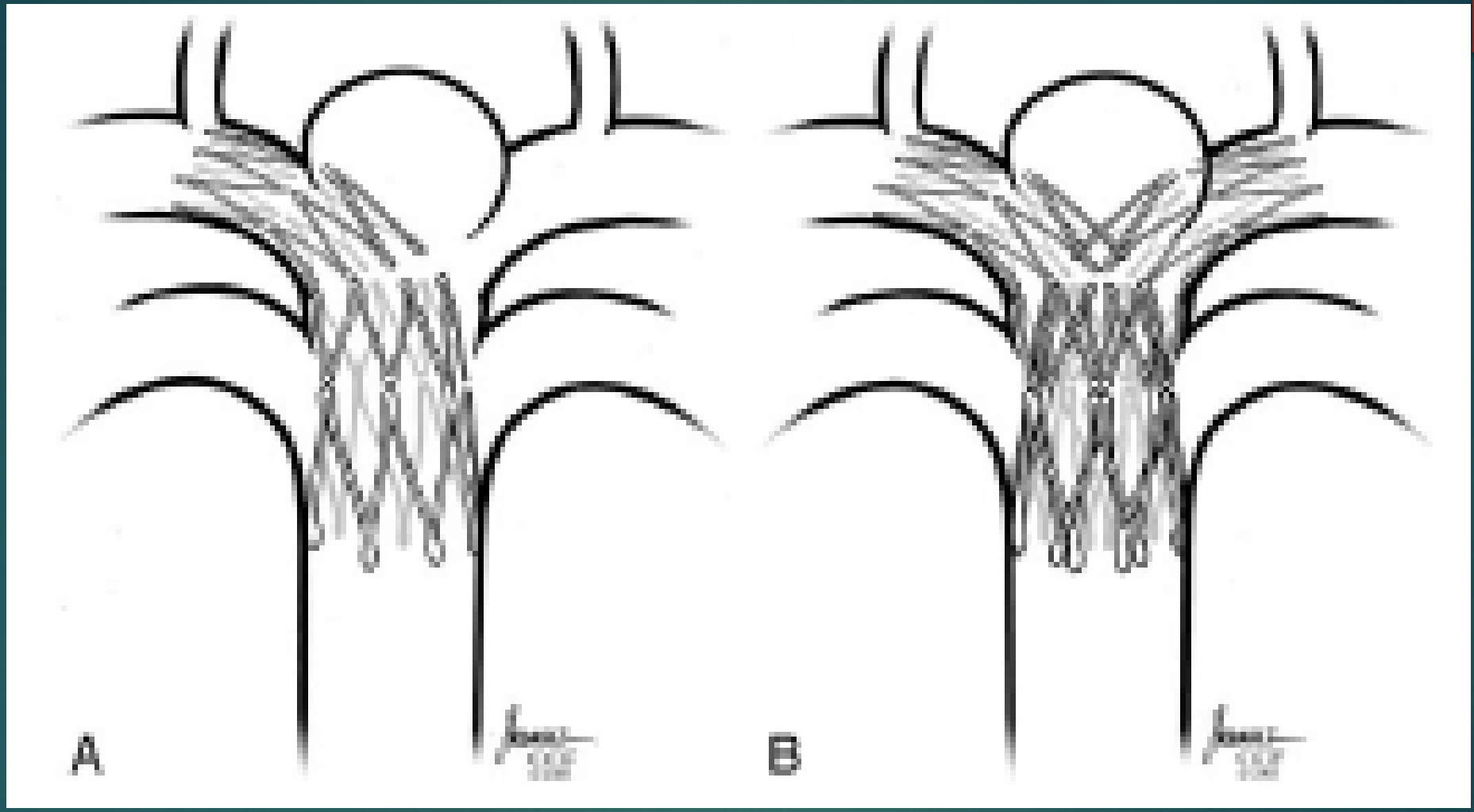




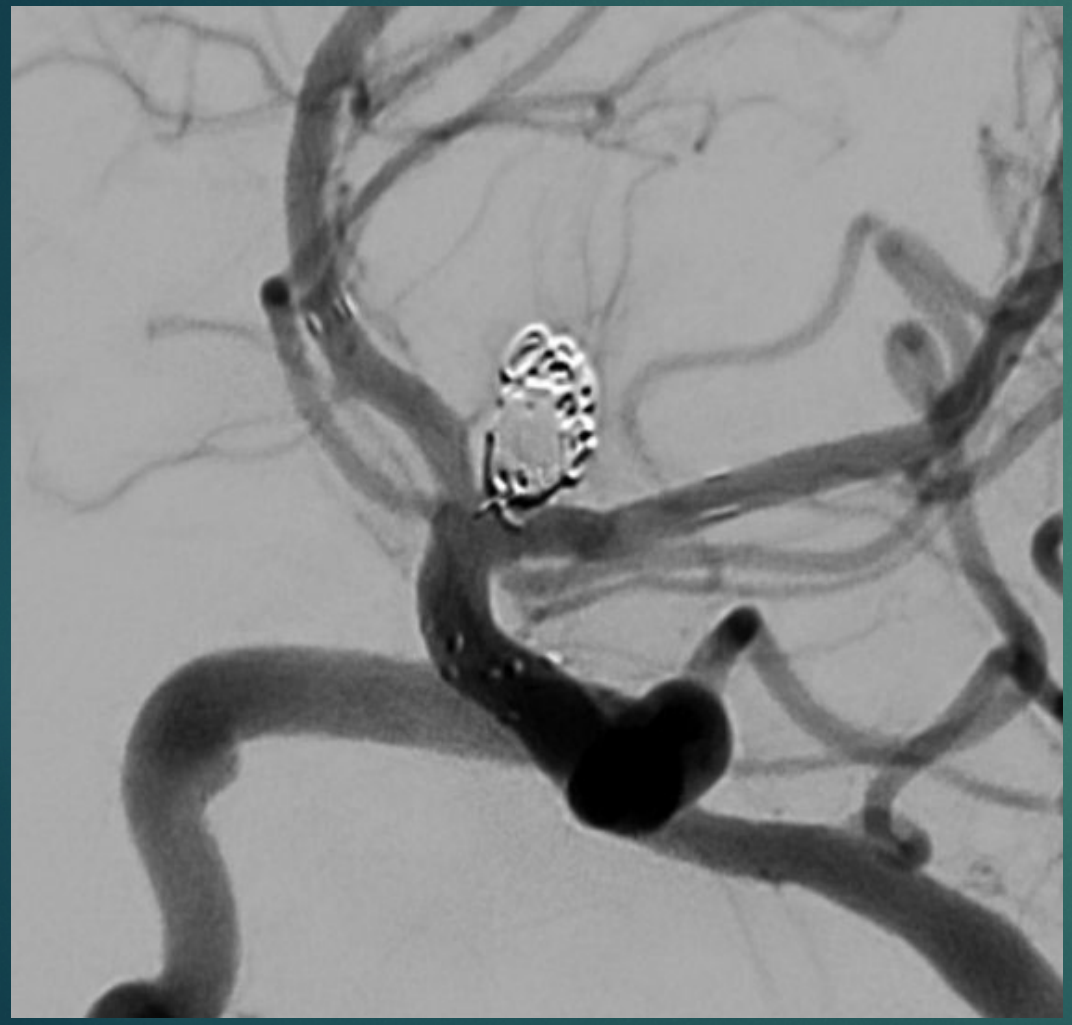
Stent Assisted Coil Embolization

- Allows for more complete packing of aneurysm while maintaining parent vessel patency over coiling alone.
- May provide some flow diversion effect
- Limited use in SAH given need for DAP therapy
- 2001-2002
  - First stent specifically designed to treat intracranial aneurysms
- 2007
  - Second stent, different design, much improved navigability and easier to be delivered.
- Today
  - Multiple new stents now deployable from coiling catheter (Atlas, LVIS Jr, etc)



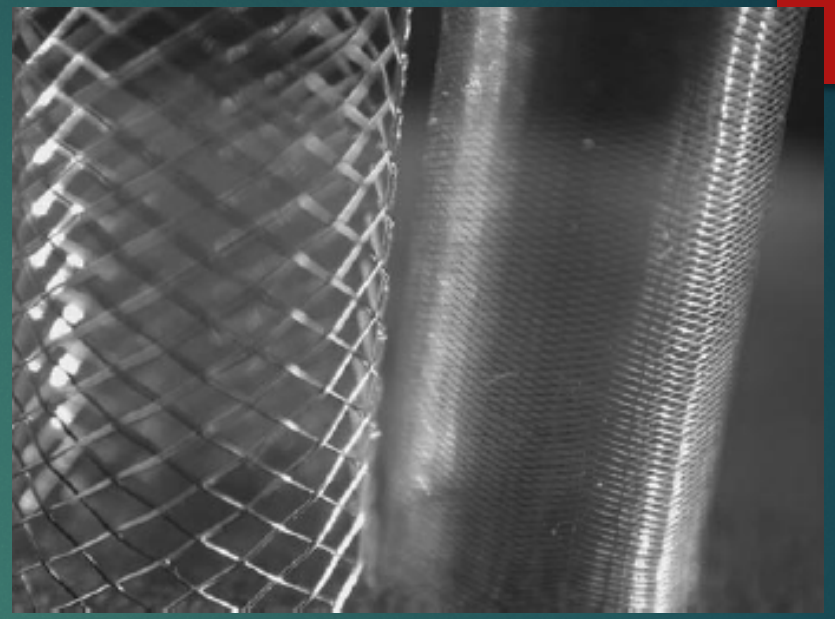

A
B

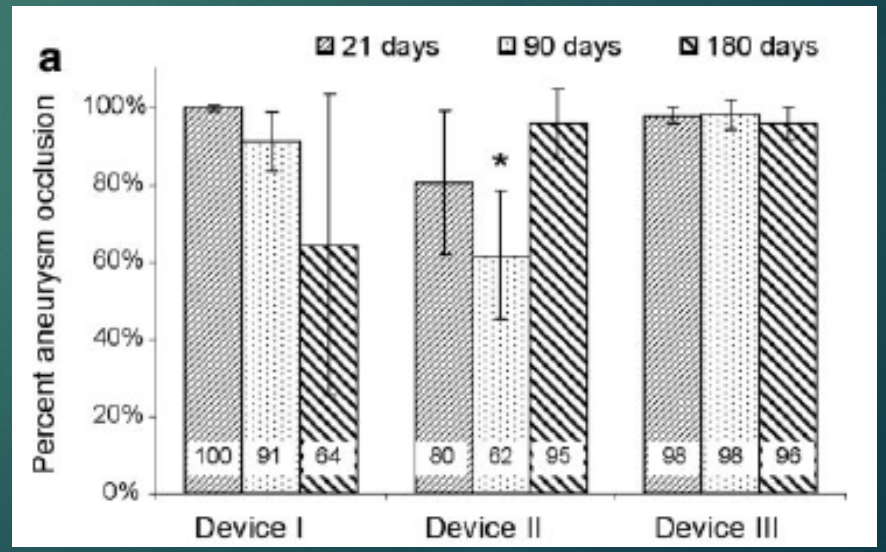
Post Y-Stent assisted coiling



Flow Diverters

- Evolution of "light metal stents"
- Higher metal to arterial wall ratio
  - Enterprise: 5-6%
  - Pipeline: 35%
- Pore to mm^2 ratio
- Game changer in the treatment of side wall aneurysms
- Developed for treatment of giant aneurysms now used for smaller aneurysms
- Ideally used prior to the carotid terminus to prevent occlusion of vessel at bifurcation of incomplete occlusion of the aneurysm.
- Also requires DAP therapy





“Flow Diverters” - Braided Stents
Silk, Pipeline, Surpass and Others

Pipeline flex Shield

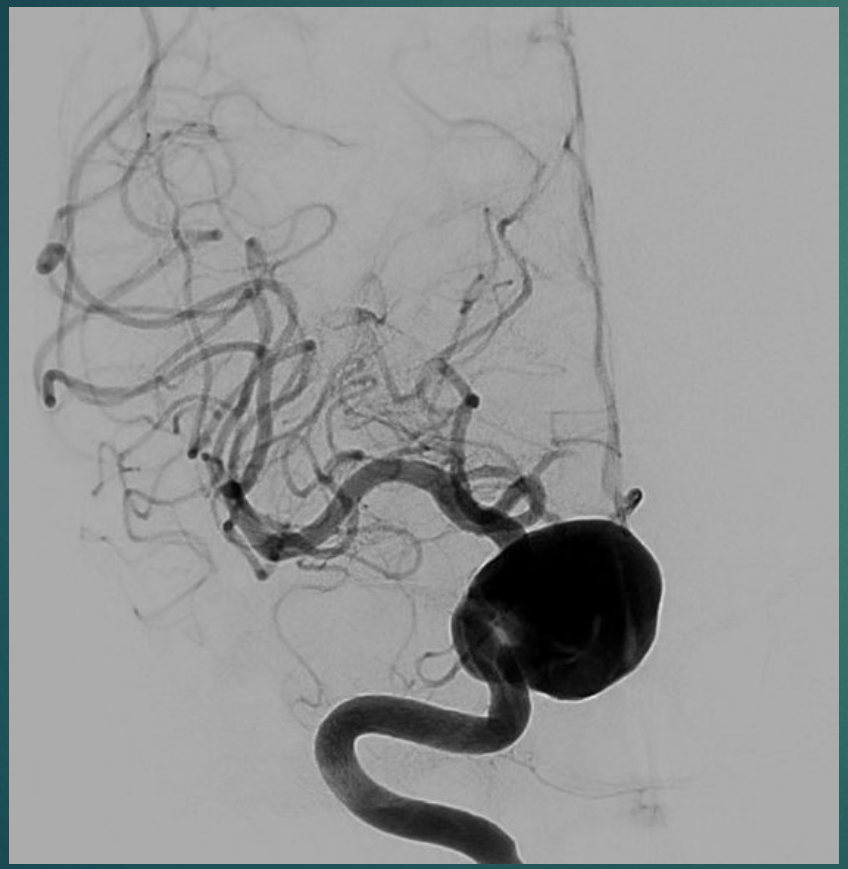
Case 3

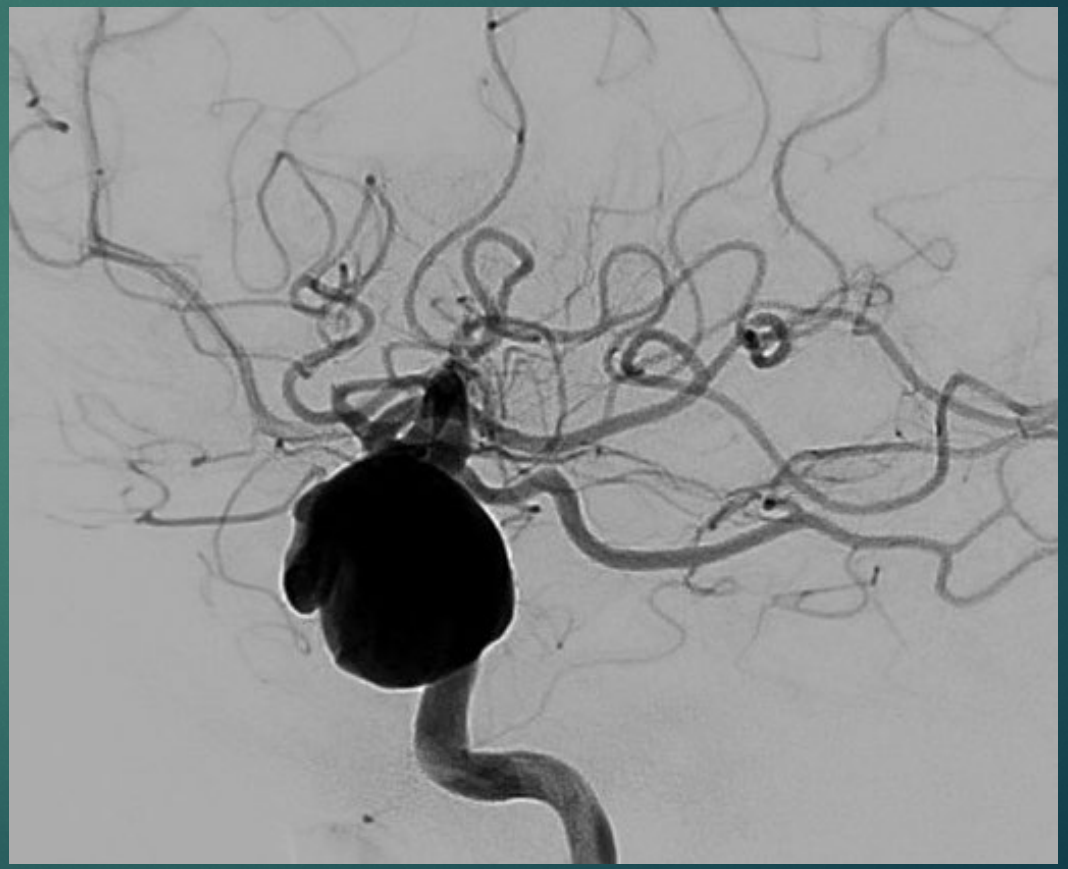
67 YO female 2 days of severe HA

Dry Head CT

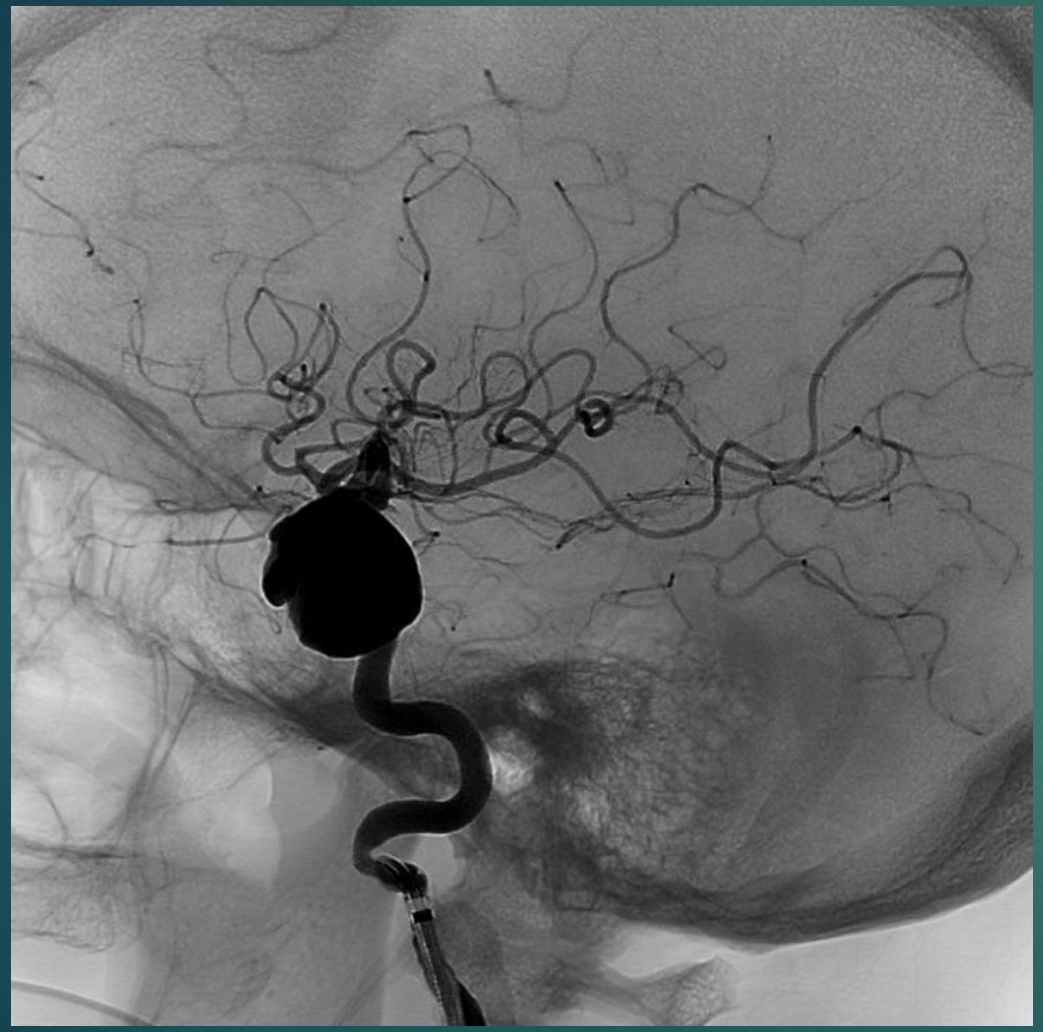
CTA with 2.6 CM R Cavernous aneurysm

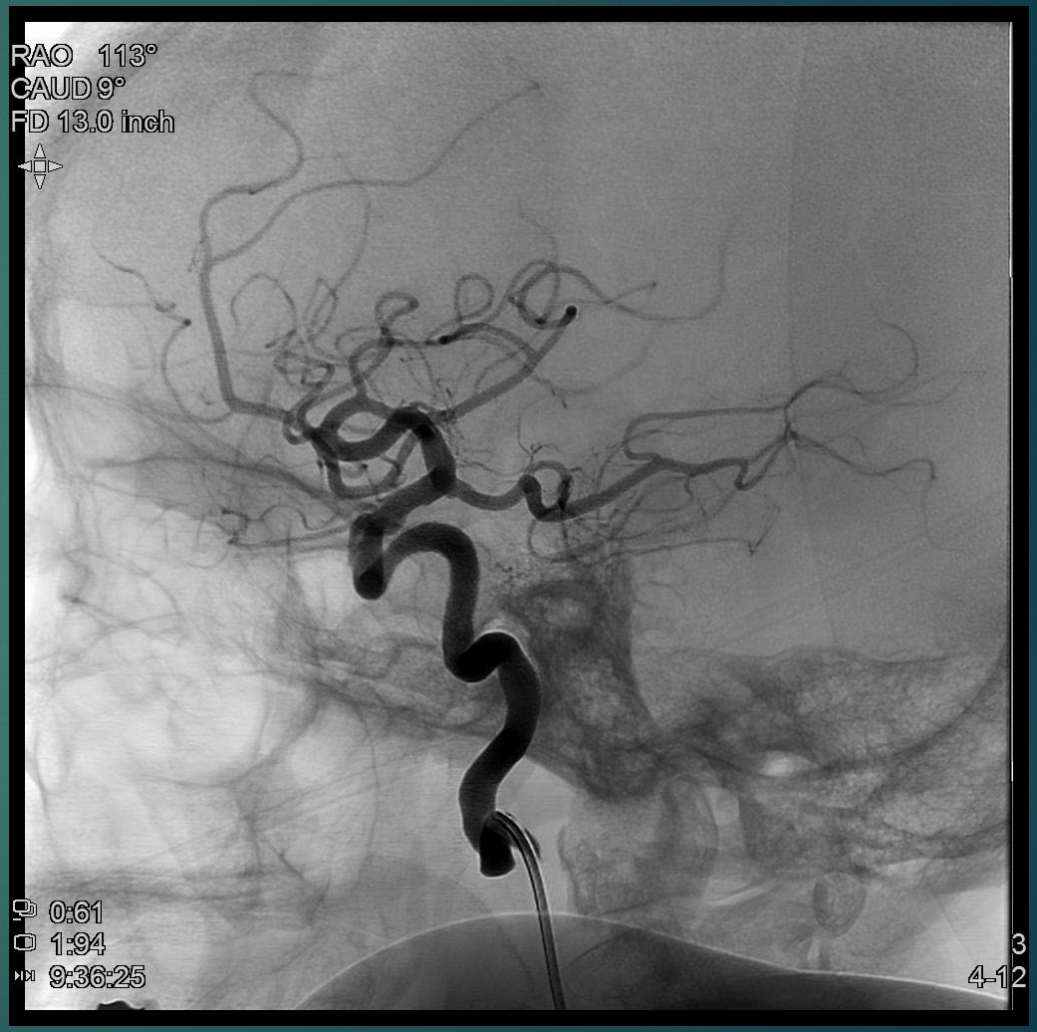
Loaded with ASA and Plavix for Pipeline Embolization





Pretreatment and 6 Mo Follow-up





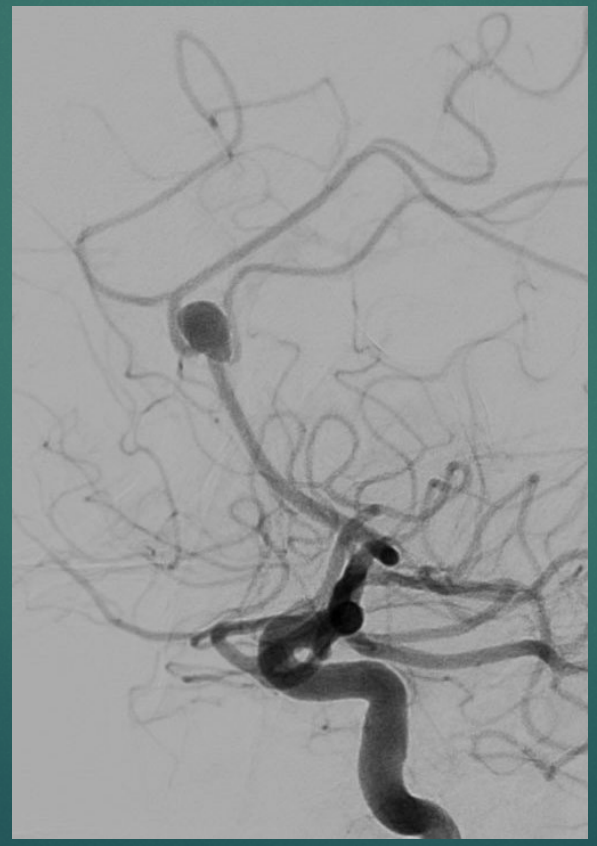
Case 4

Endovascular treatment isn't for everyone

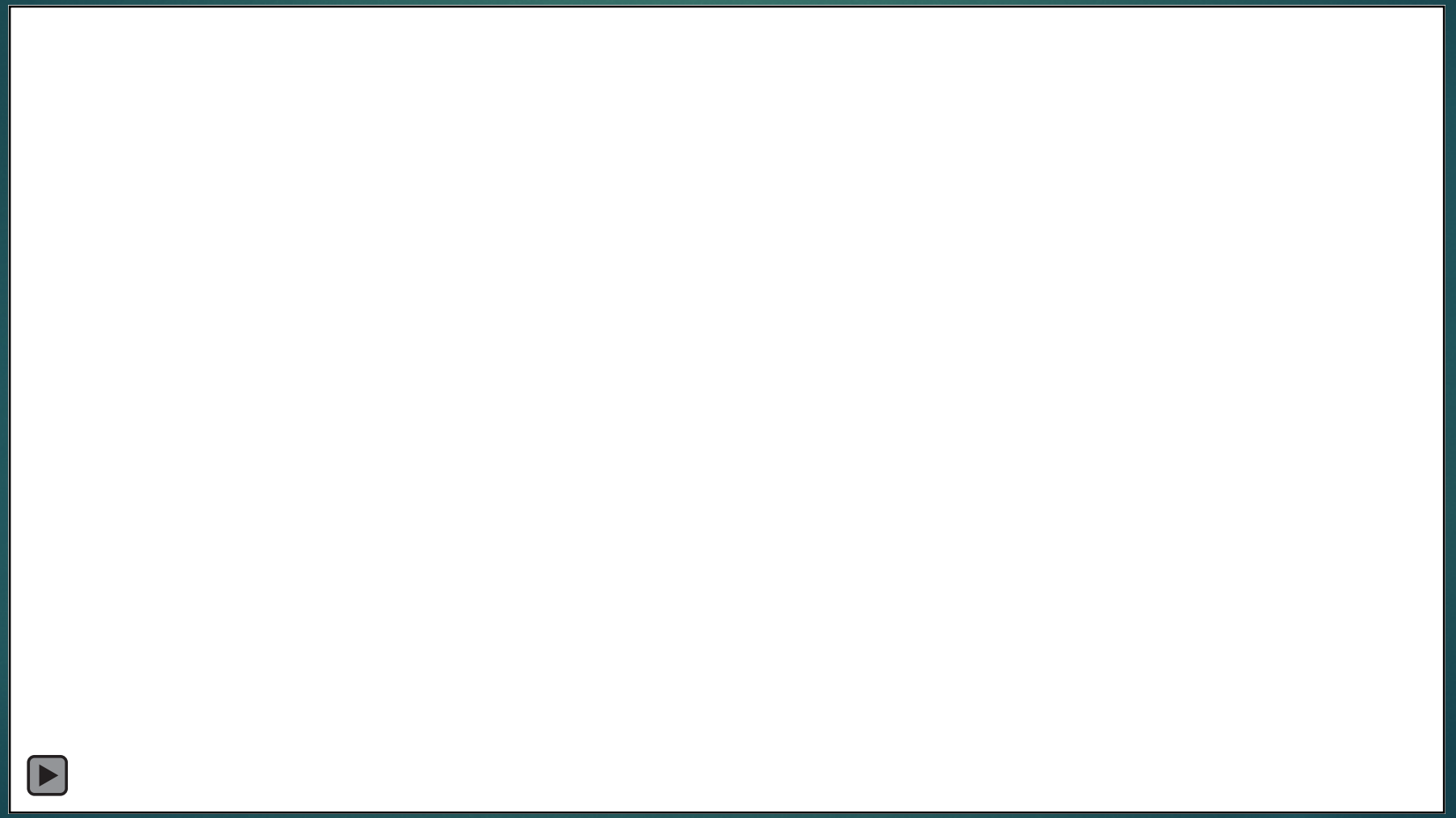
56 YO female with enlarging distal ACA aneurysm

MRA Left distal ACA

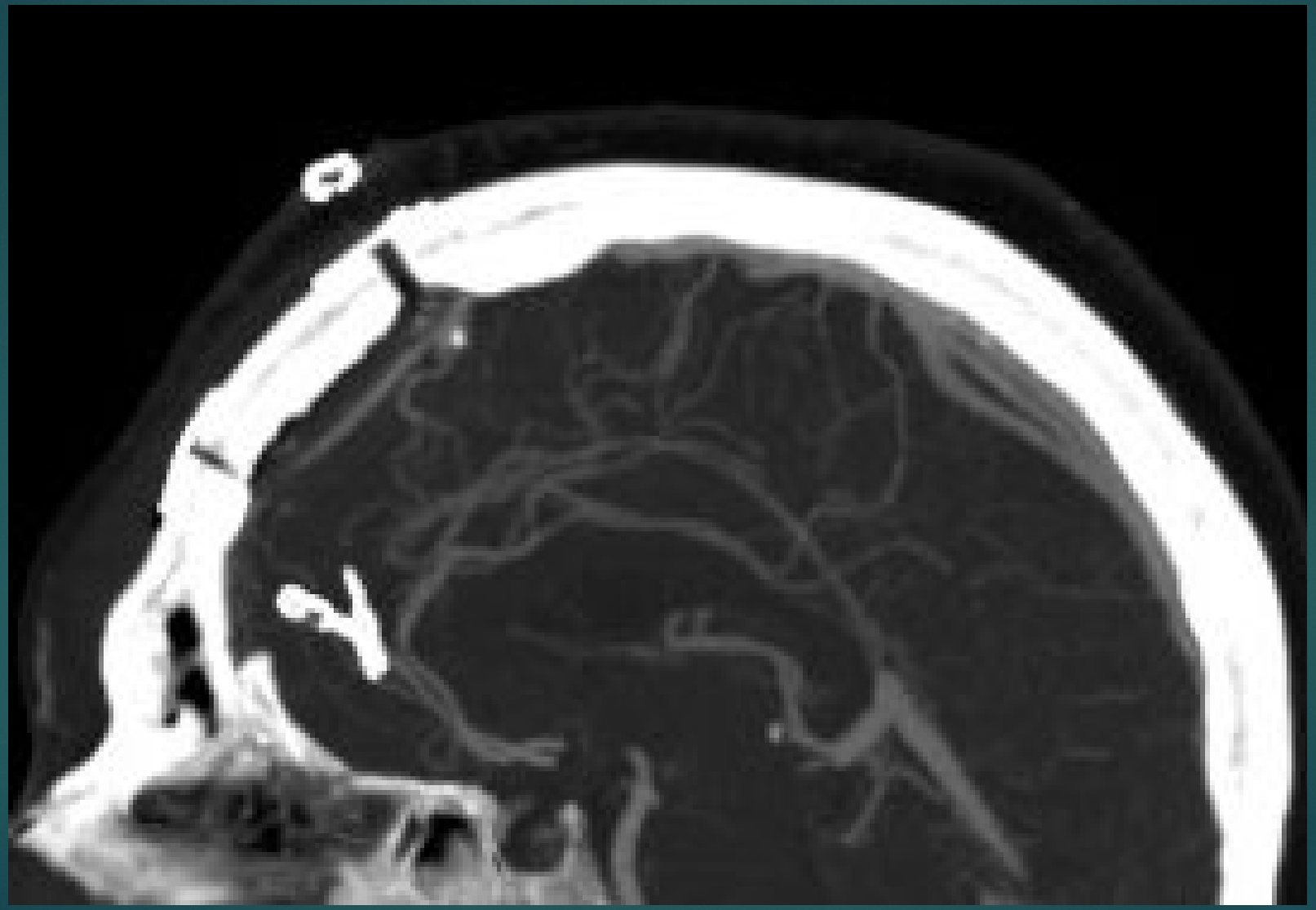
DSA Distal Left ACA aneurysm



Given Anatomy and Potential for Branch loss Clipping was recommended



Postop CTA

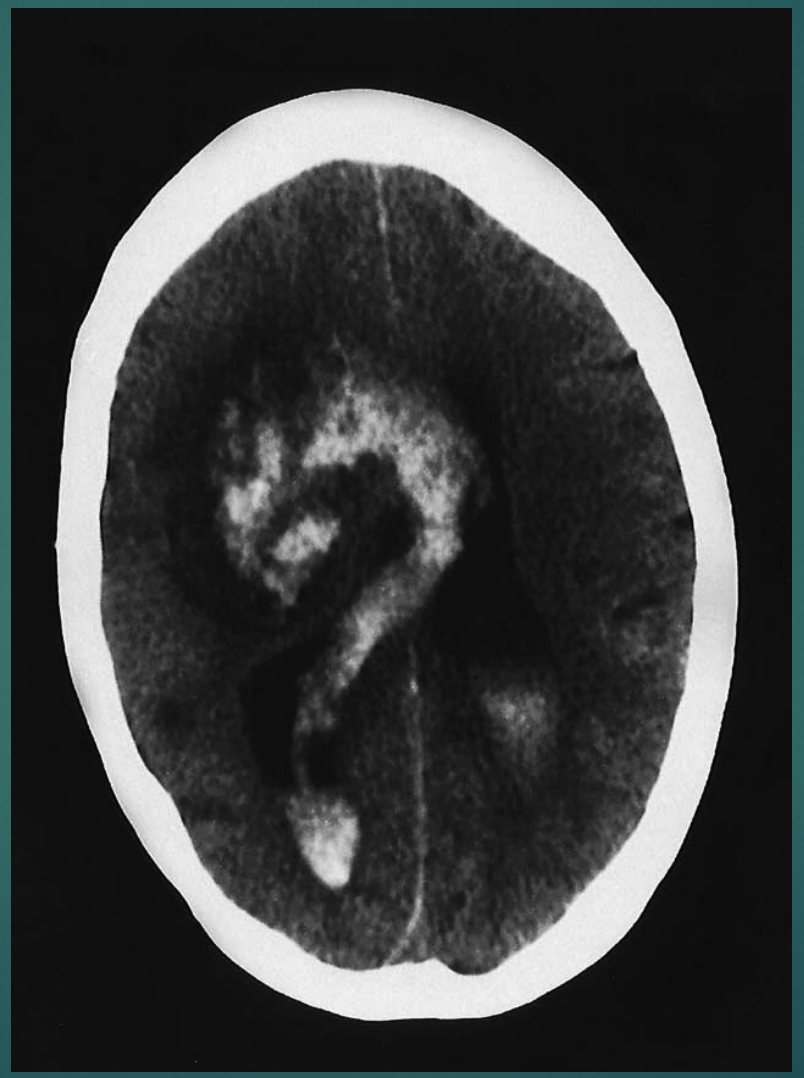


The Goal

Individualize the best treatment possible for each patient/aneurysm

Questions

Email: wpdaughe@sentara.com



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