WAKE UP!.....

STROKE

4TH ANNUAL PVHMC CEREBROVASCULAR SYMPOSIUM

5.10.19

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POMONA VALLEY HOSPITAL
MEDICAL CENTER
Expert care with a personal touch

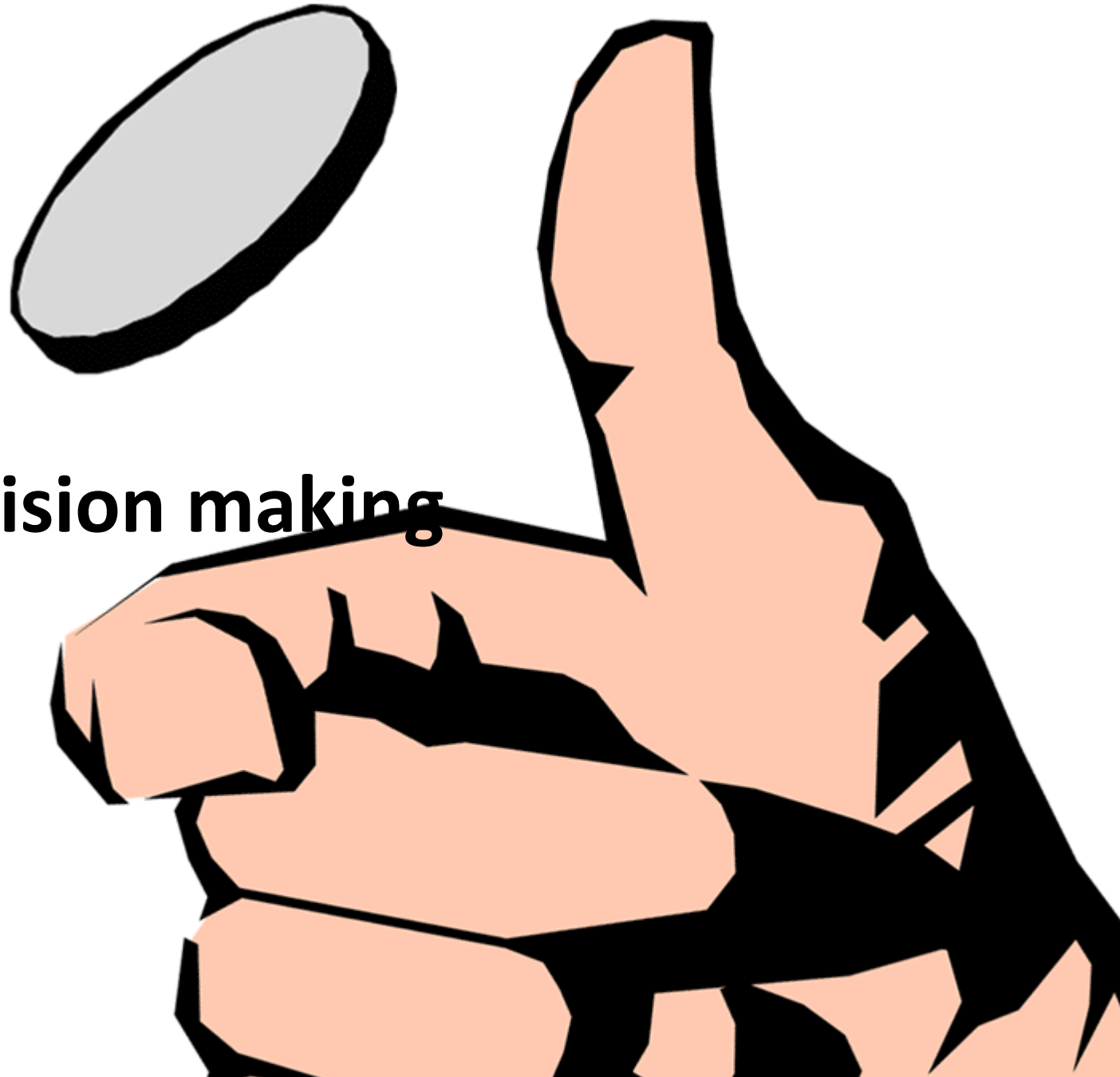
Recap of prior data

- Multiple trials demonstrate benefit of endovascular thrombectomy for large vessel occlusion within 6 hours
  - MR CLEAN, REVASCAT, SWIFT PRIME, ESCAPE, EXTEND-IA
- Additional trials demonstrate benefit for strokes 6-24 hours (DEFUSE 6-18 hrs, DAWN 6-24 hours)

Necessary workup

- Large vessel occlusion=intracranial ICA, M1/M2, basilar
- Non contrast head CT (ASPECT</=7 beyond 6 hours and </=6 w/in 6 hours)
- Core infarct imaging (CTP, MRP, DWI MRI)
- TPA not contraindicated with endovascular treatment
- ASPECT=Alberta Stroke Program Early CT. Normal CT=10, -1 point for every area of ANL

Clinical decision making

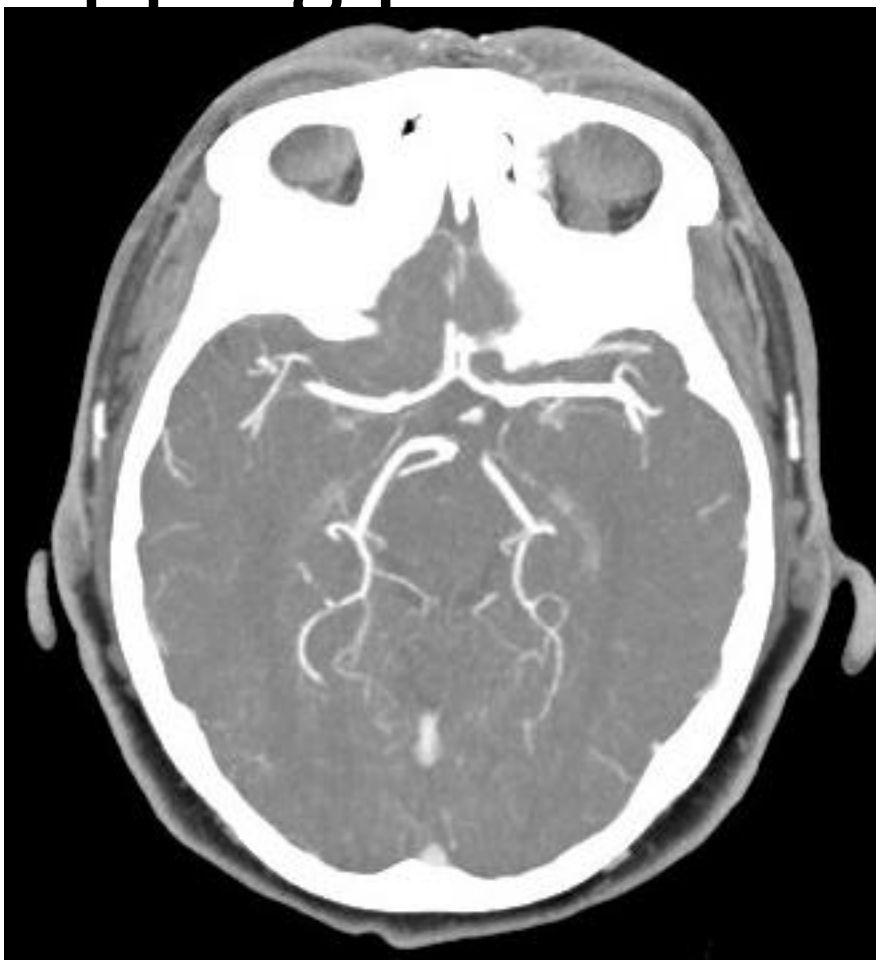


Requirement

- Recognition of stroke
- Knowledge of stroke treatments and their time constraints, inclusion/exclusion criteria
- Stratify individual risk/benefit for each patient

76 F, AFIB, on NOAC, sent from clinic for dropping pills

- CT negative (ASPECT 10)
- NIHSSS ~ 4, mild L weakness/neglect, slurred speech
- CTA with distal R MCA occlusion at bifurcation



Endovascular treatment, yes/no?

Pros

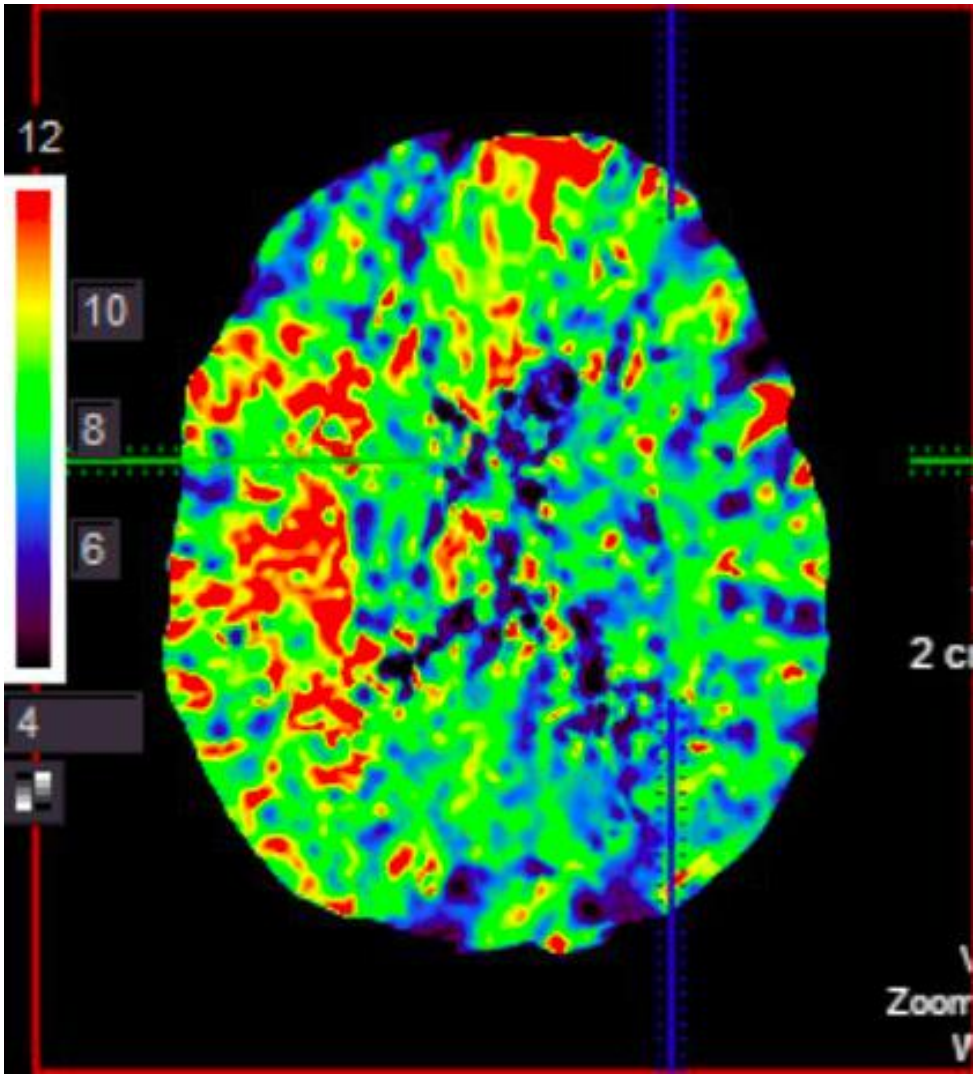
- Standard treatment (level I recommendation AHA/ASA)
- Ineligible for IV tPA due to NOAC

Cons

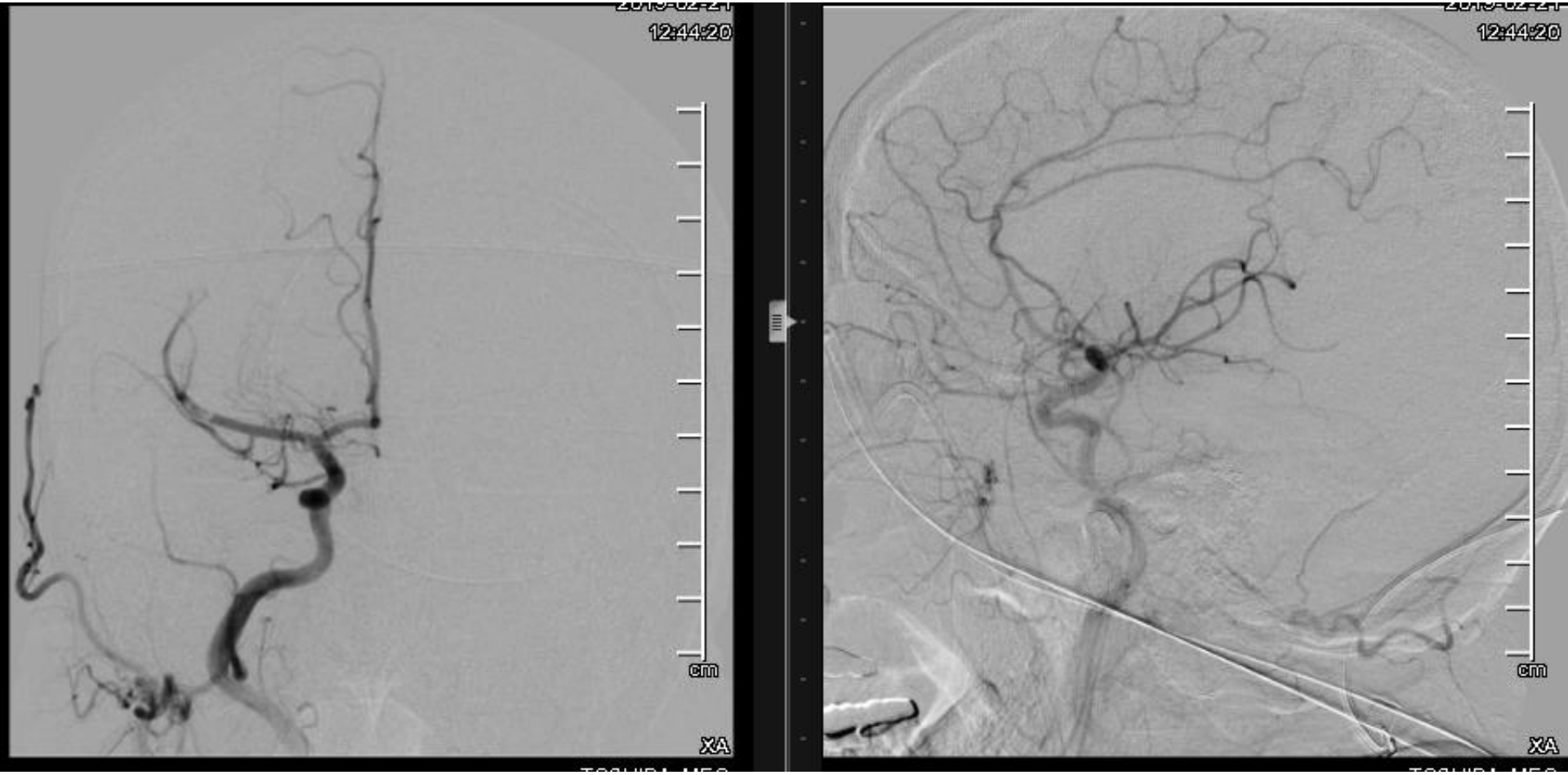
- Low NIHSSS
- Inherent risks of invasive treatment (6% risk of symptomatic ICH, other risks=worsening stroke, new stroke, contrast allergy or nephropathy, access site hemorrhage or vascular injury)

Perfusion imaging

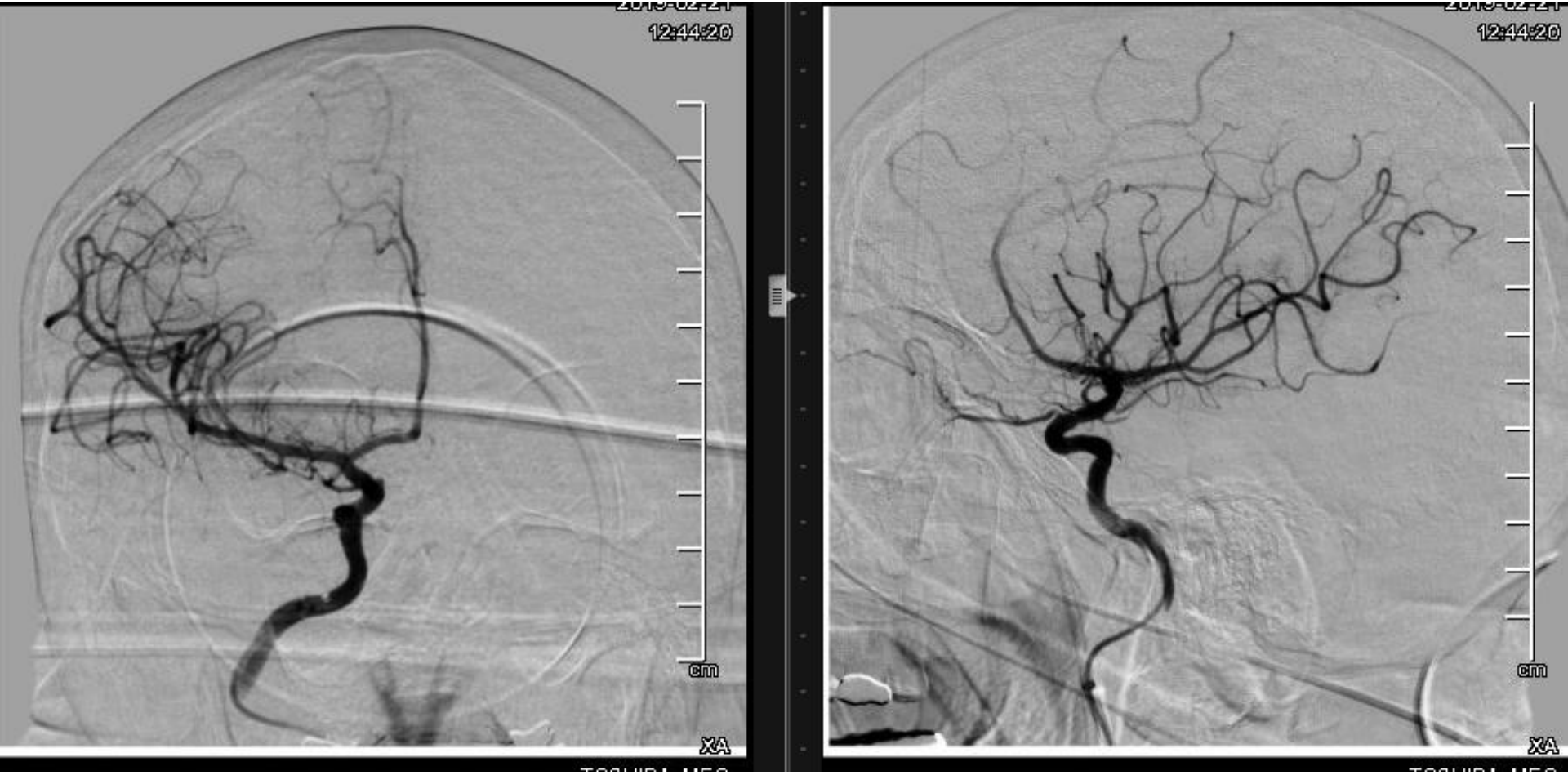
- Hypoperfused volume (T max) 77.91 cc, core (decreased CBF) 1.08 cc
- Mismatch 98.61%



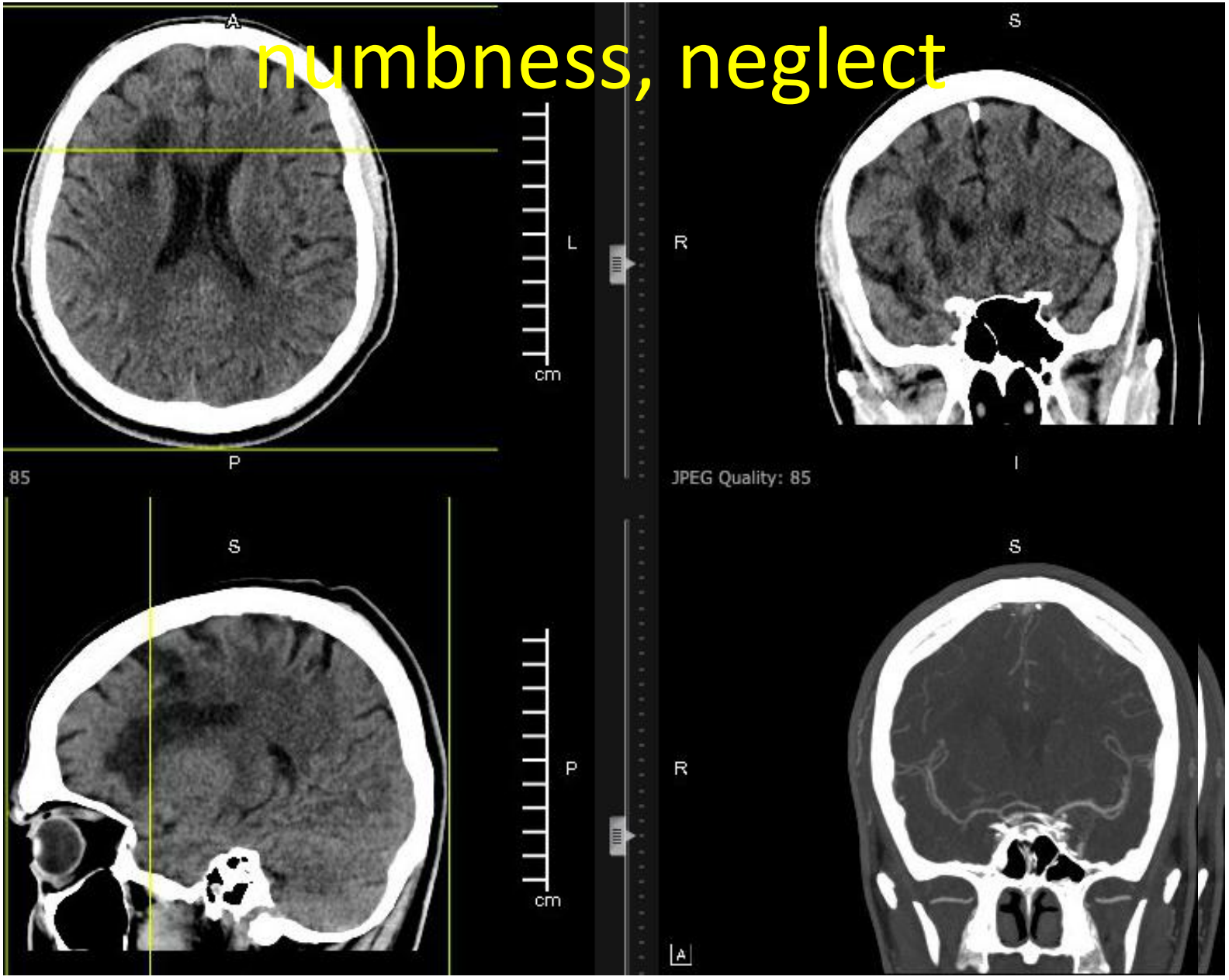
R ICA Angiogram



R ICA angiogram, post treatment

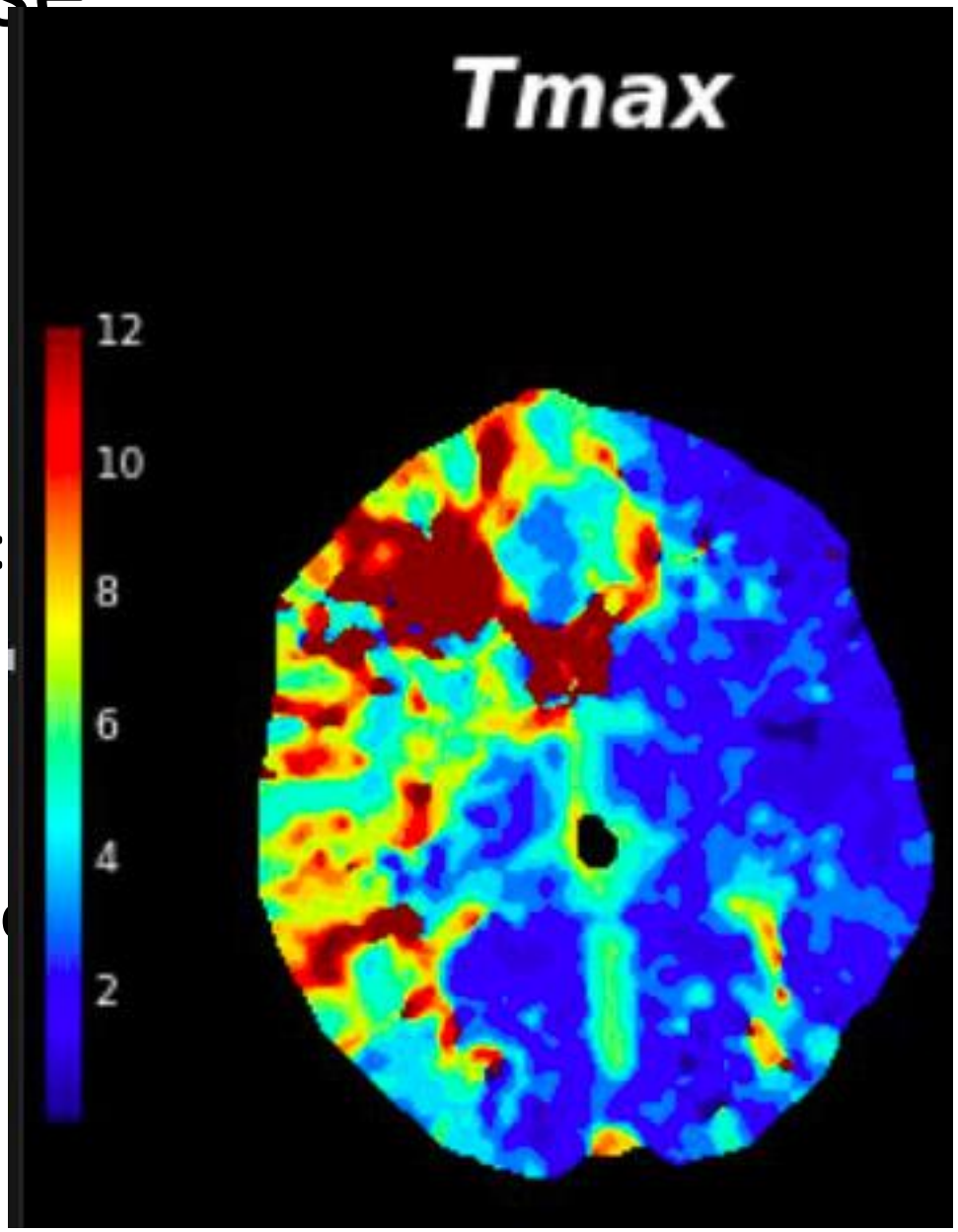


41 M, DM, 3rd ER visit in 2 weeks, L numbness, neglect



Prior hospital course

- 11 days prior: 1st visit for same symptoms: CT, CTA negative. MRI acute R frontal stroke. **Tx ASA**
- 7 days prior: 2nd visit, CTA: high grade stenosis M2, unchanged from prior, no new MRI sroke. **Tx: DAPT**
- Day of visit: CTA high grad stenosis R ICA and MCA. CTP: prolonged MTT R MCA distribution. **Tx: ?**



Endovascular treatment?

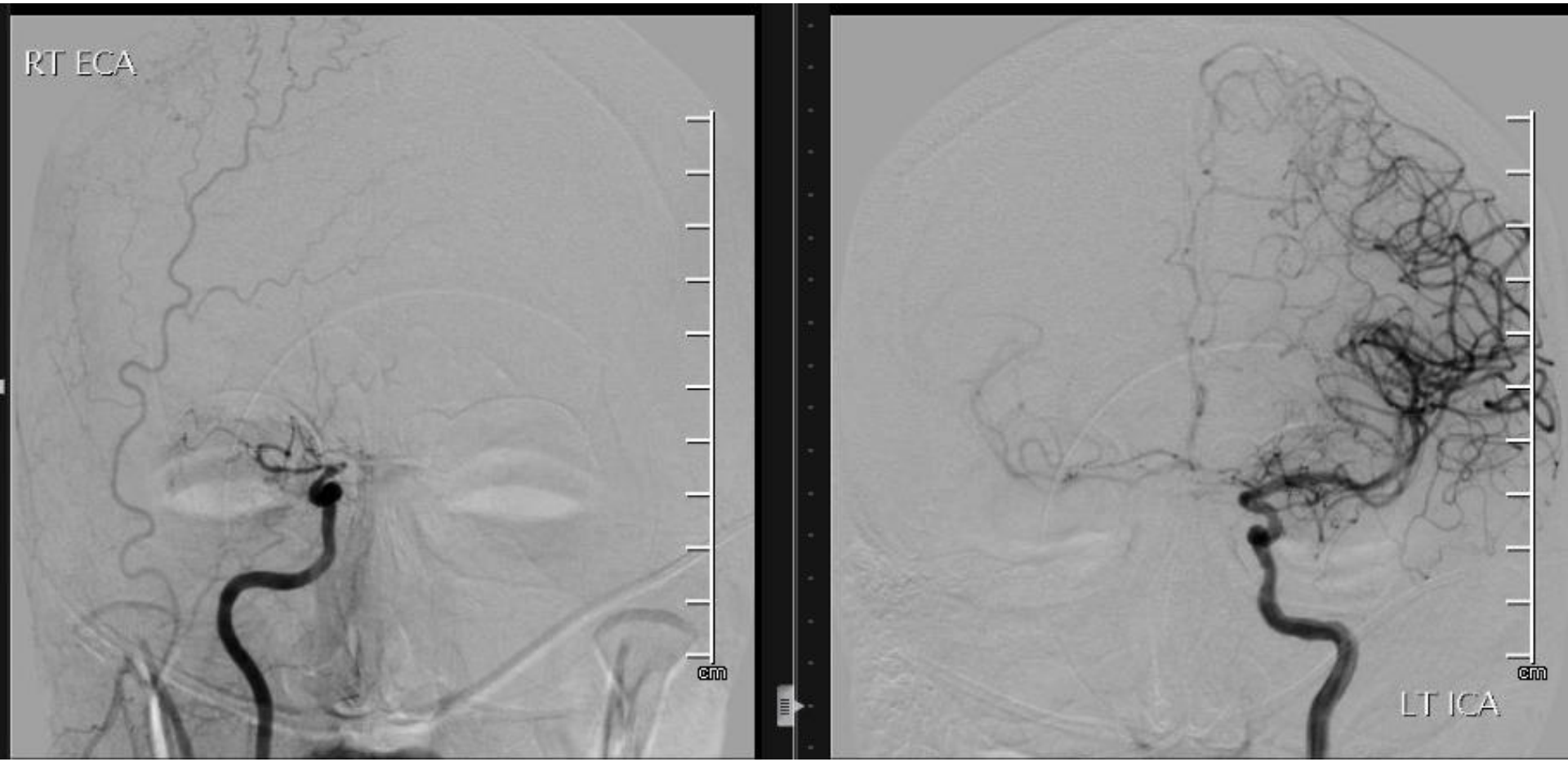
Pros

- No other option for intervention
- Multiple recurrences w/in 2 weeks (high risk ICAD group), failing maximal medical mgt.

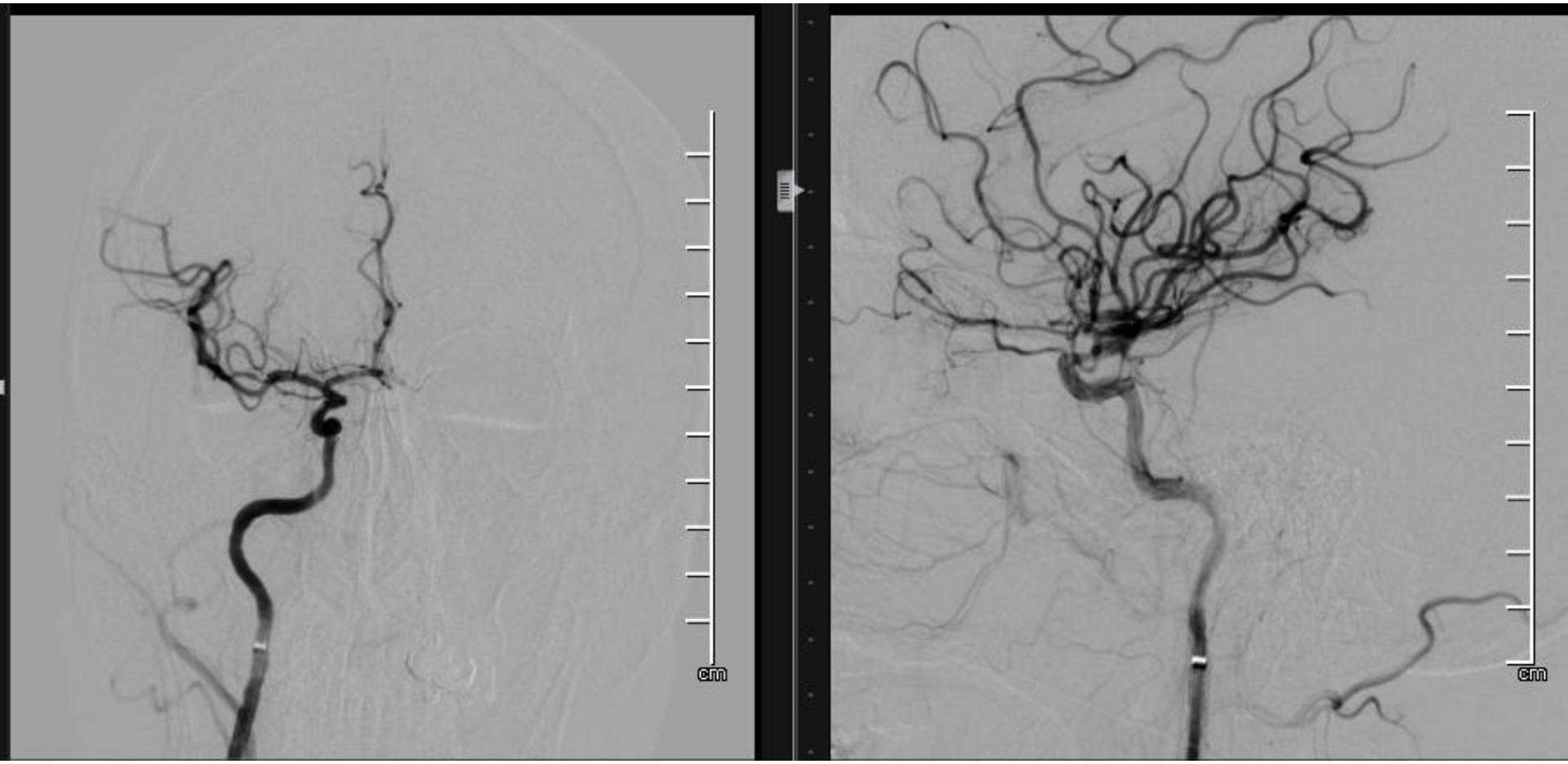
Cons

- Stroke already seen on CT
- Patent (though stenotic) lesion
- Relatively low NIHSSS
- Time frame??

R and L ICA angiogram



Post thrombectomy



24 M, tetraparesis, somnolence

HPI: Pt is a 24 y/o male with no prior past medical history presents due to headache. Per mother and sister, patient has been having sinus problems for four months and sore throat. He was found negative for Strep but PA gave penicillin course which he completed a week and a half ago. Sunday morning patient had nausea, vomiting, fever and headache. He tried to go to bathroom but could not get up. He complained of no sensation felt on the left side of his body, weakness and tingling. He could not speak, flopped around and his eyes were not focusing. Patient was BIBA to PVH. Per ER medical student, patient in the morning had a hypereflexive patellar tendons bl. He exhibited decerebrate posturing. Additionally, he had clonus this morning. Patients family denies any trauma and falls. Patient is currently intubated.

Hospital course

- Presented to another ER few days prior with mild L numbness & weakness, fever. Dx with infection and d/c on Abx
- MRI reportedly NL
- No vascular imaging
- CT on current presentation negative, intubated, sent for LP (negative), then CTA→ basilar artery occlusion

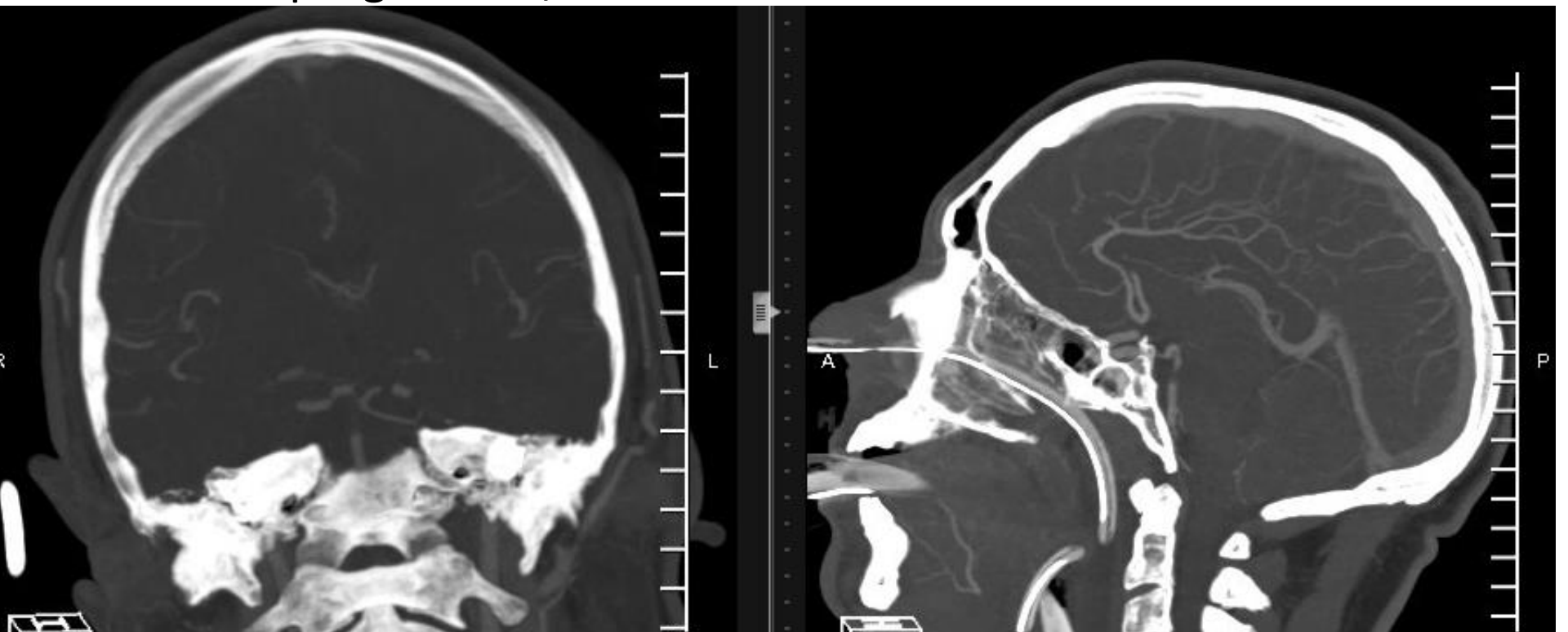
Endovascular treatment, yes/no?

Pros

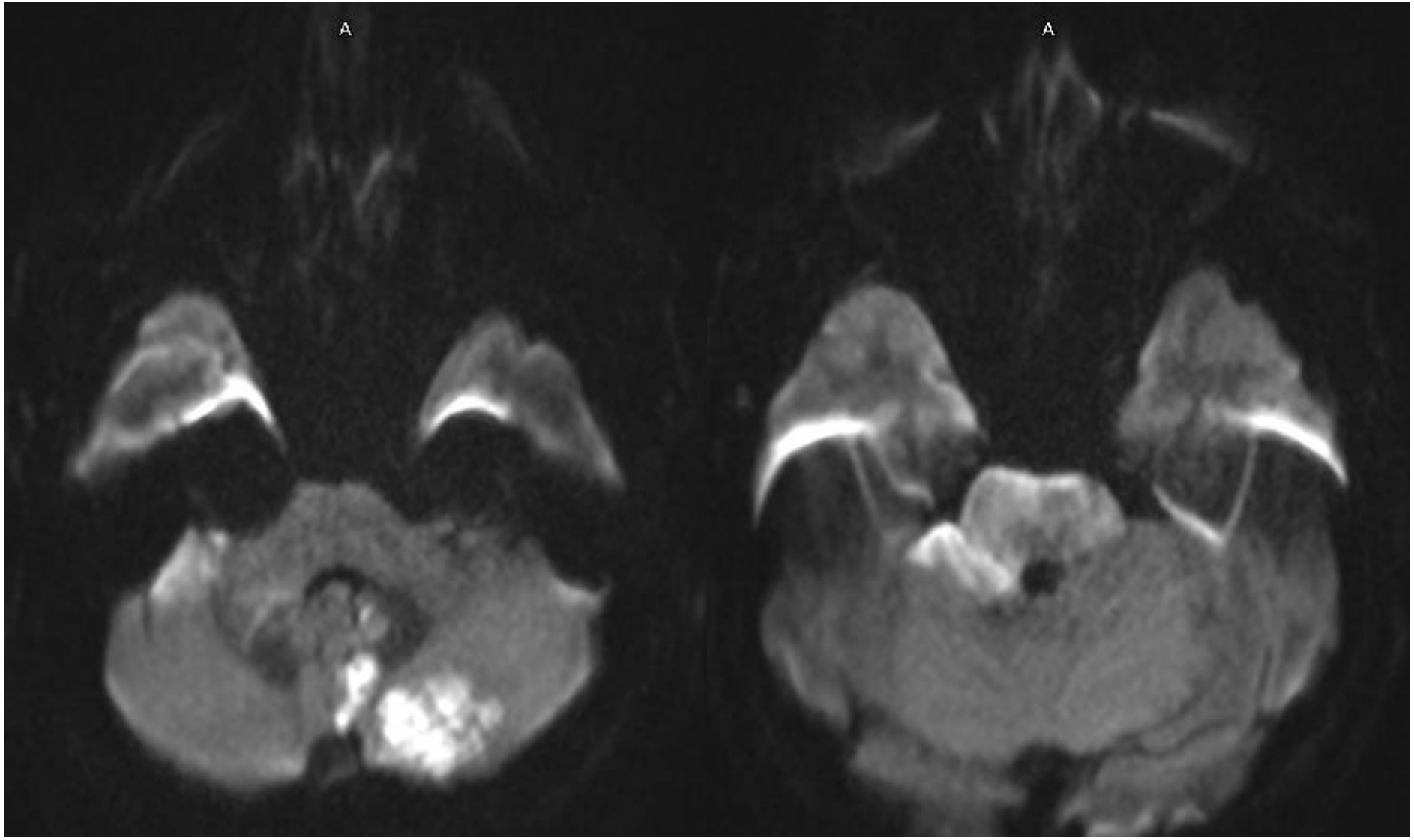
- What else?
- No other option for treatment
- Grim prognosis w/o tx

Cons

- Not proven for basilar
- Outside of time window



DWI MRI



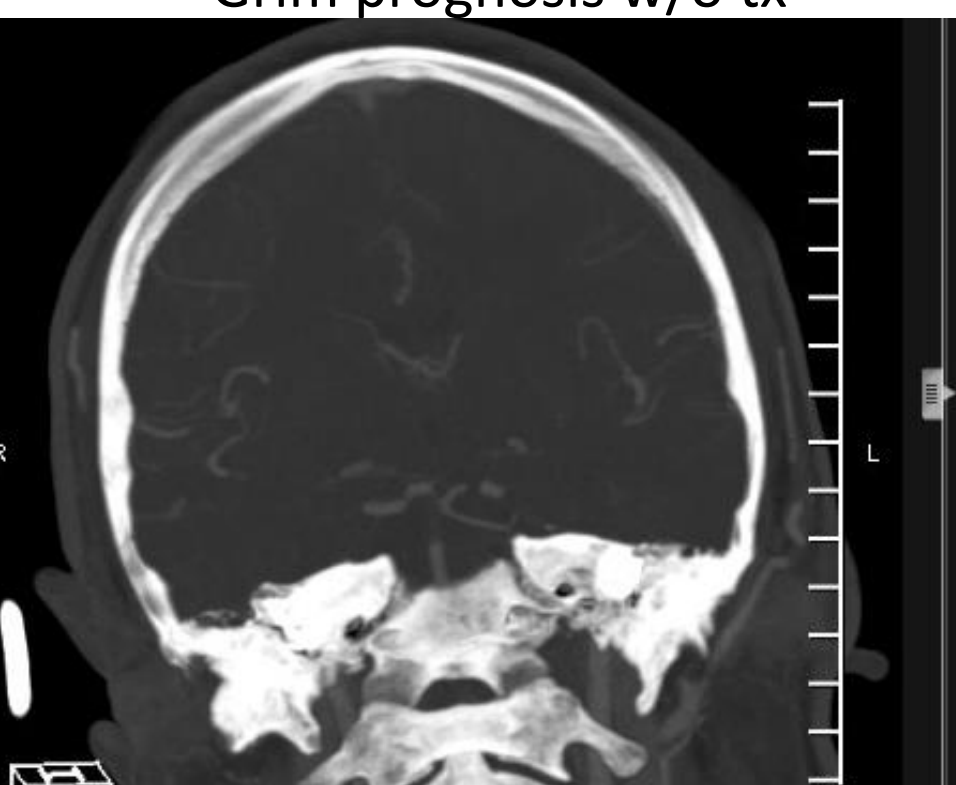
Endovascular treatment, yes/no?

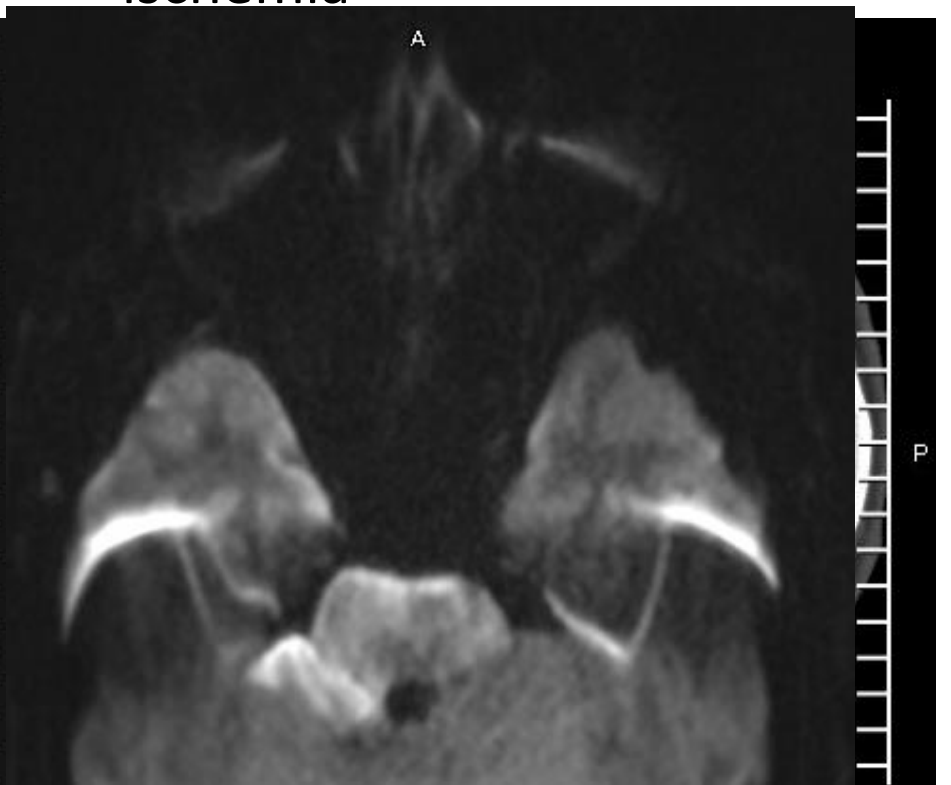
Pros

- What else?
- No other option for treatment
- Grim prognosis w/o tx

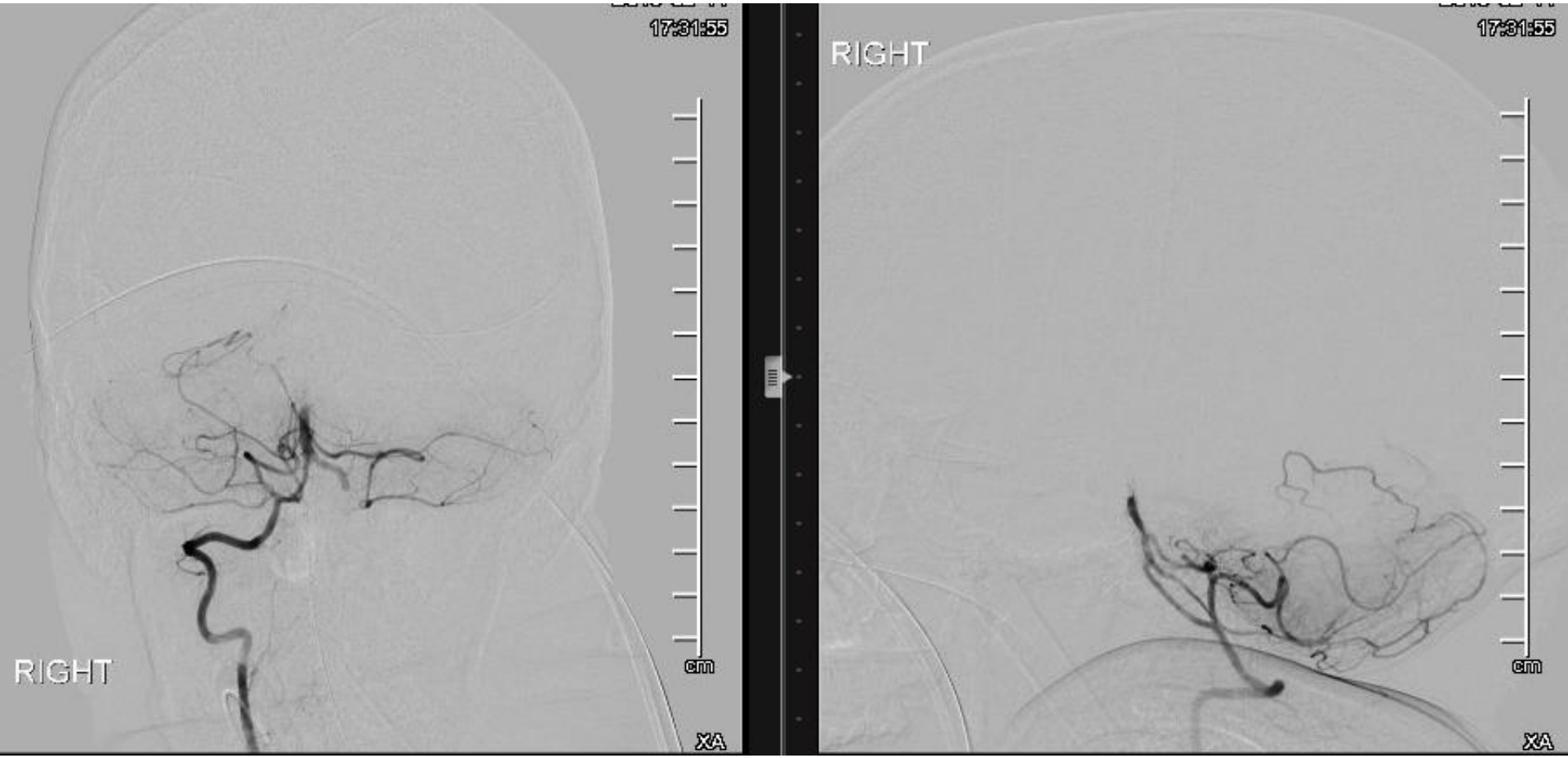
Cons

- Not proven for basilar
- Outside of time window
- Extensive brainstem ischemia

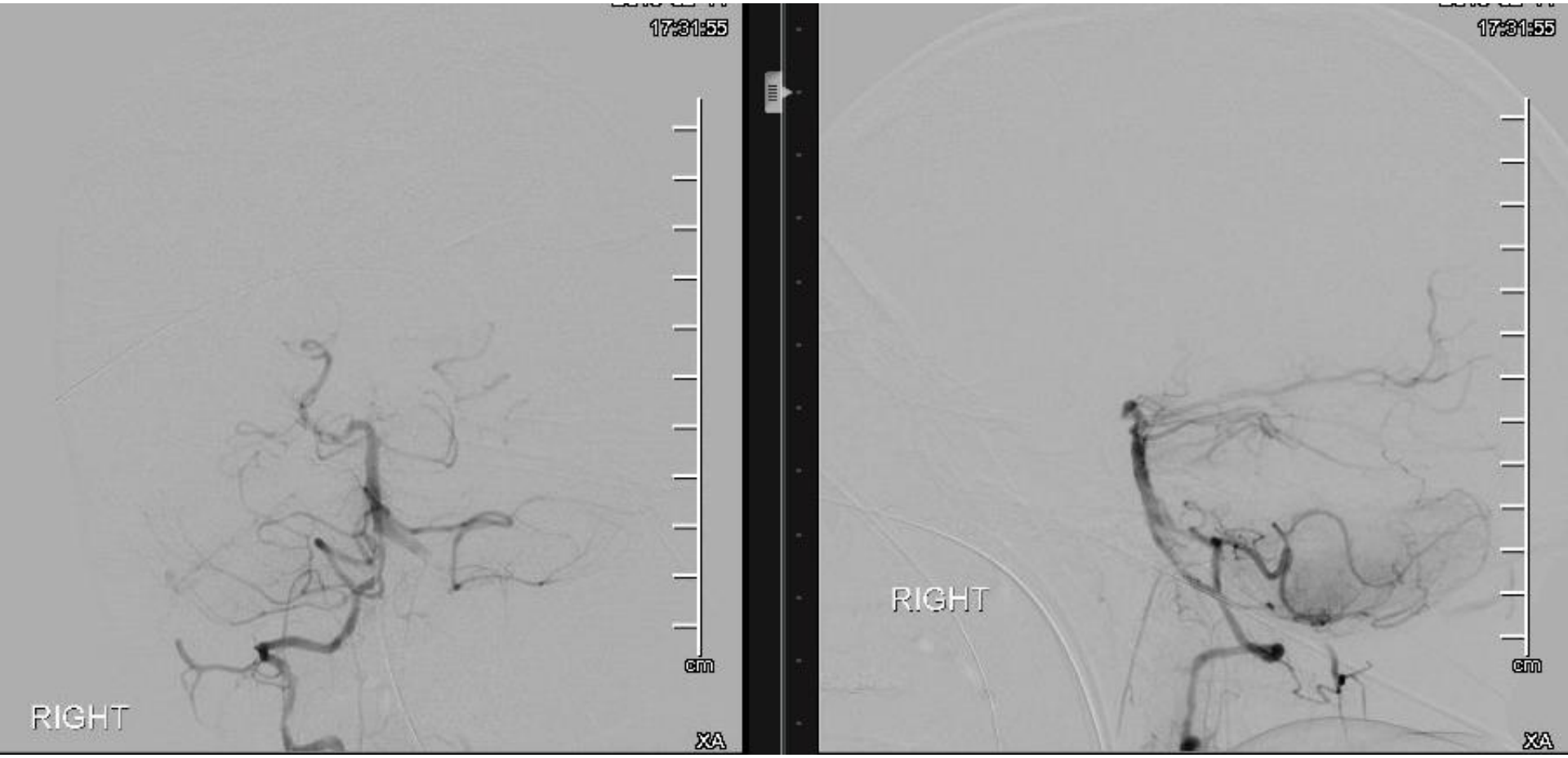




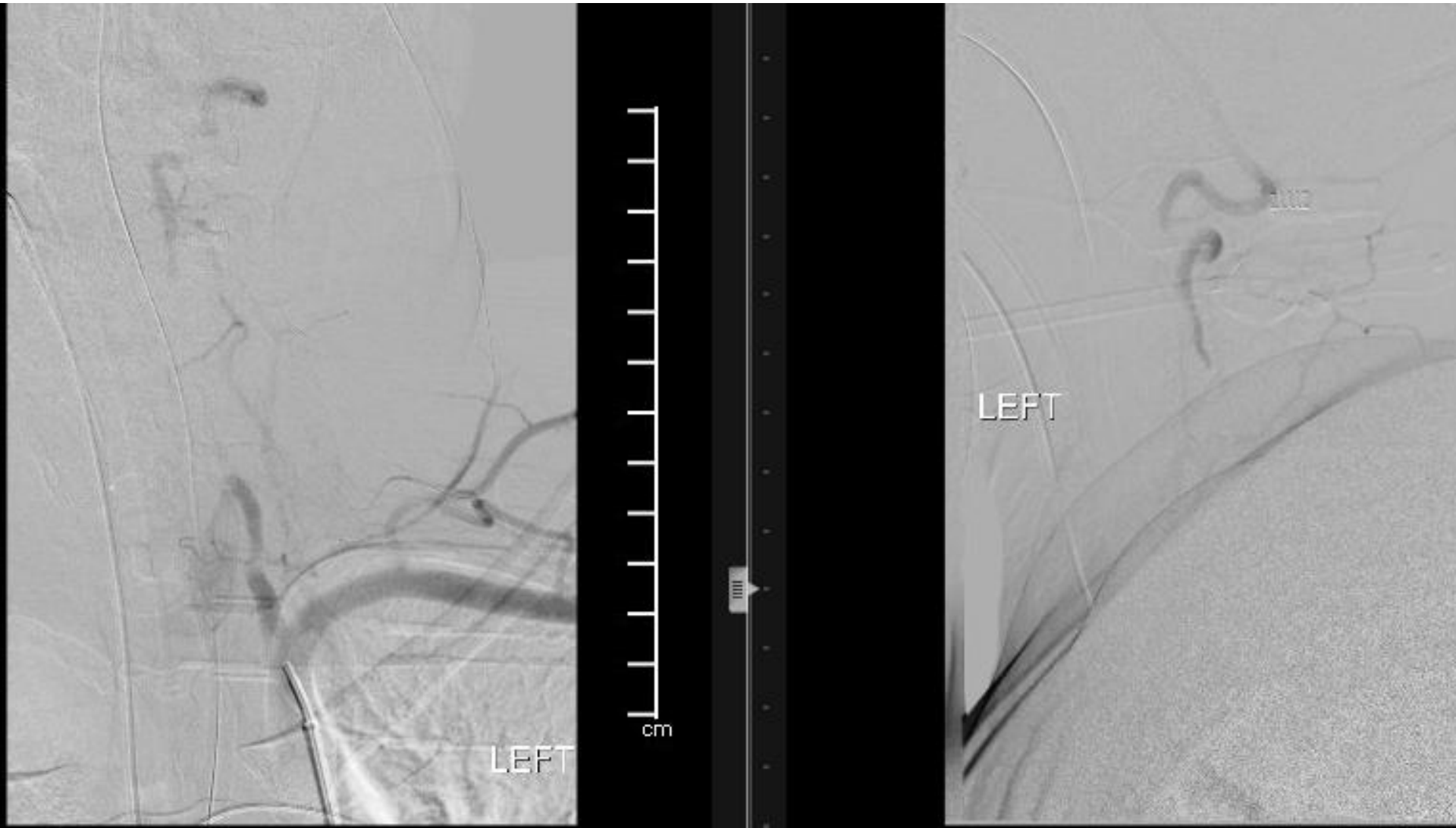
R vertebral artery angiogram



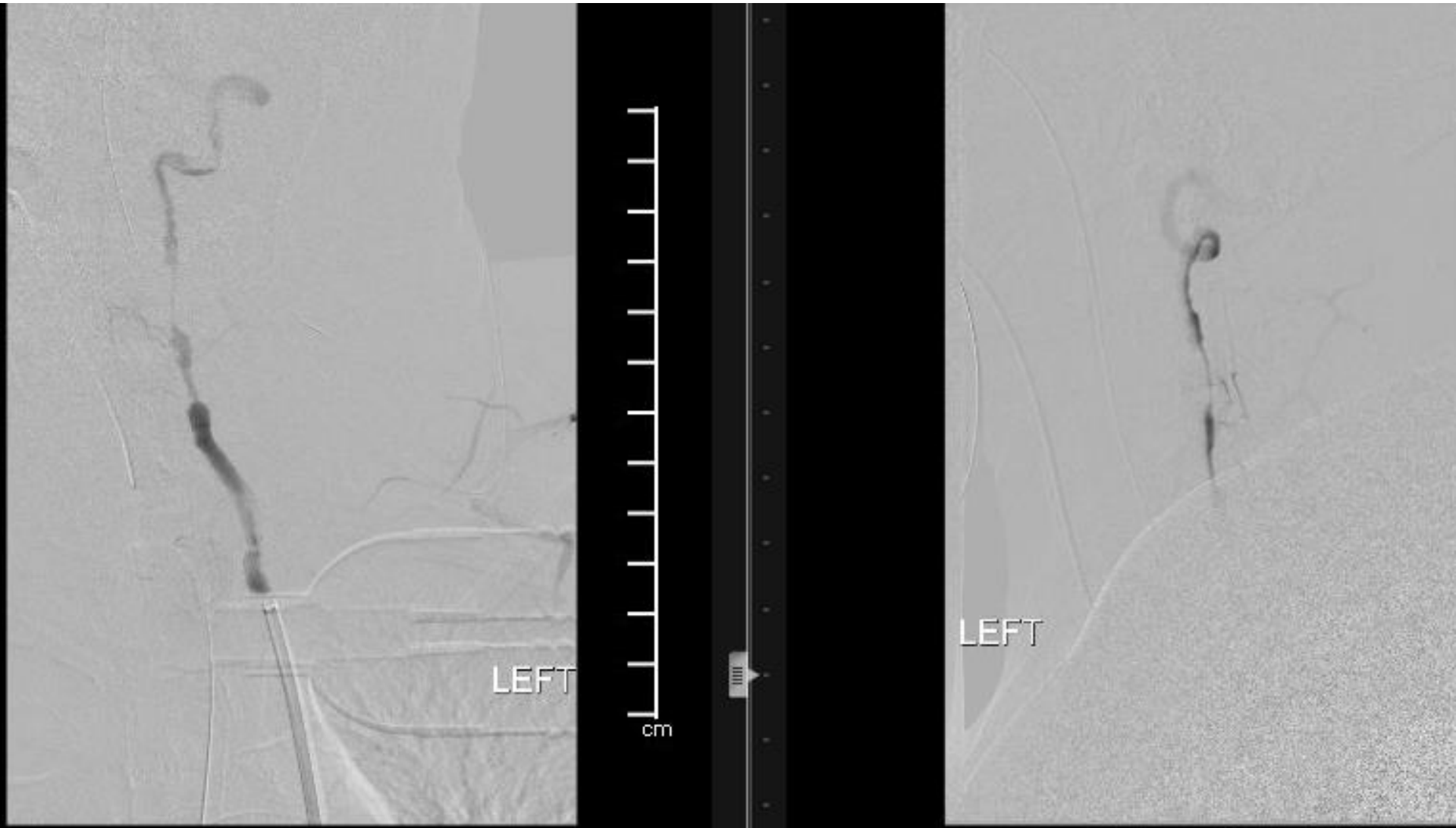
R VA angiogram, post



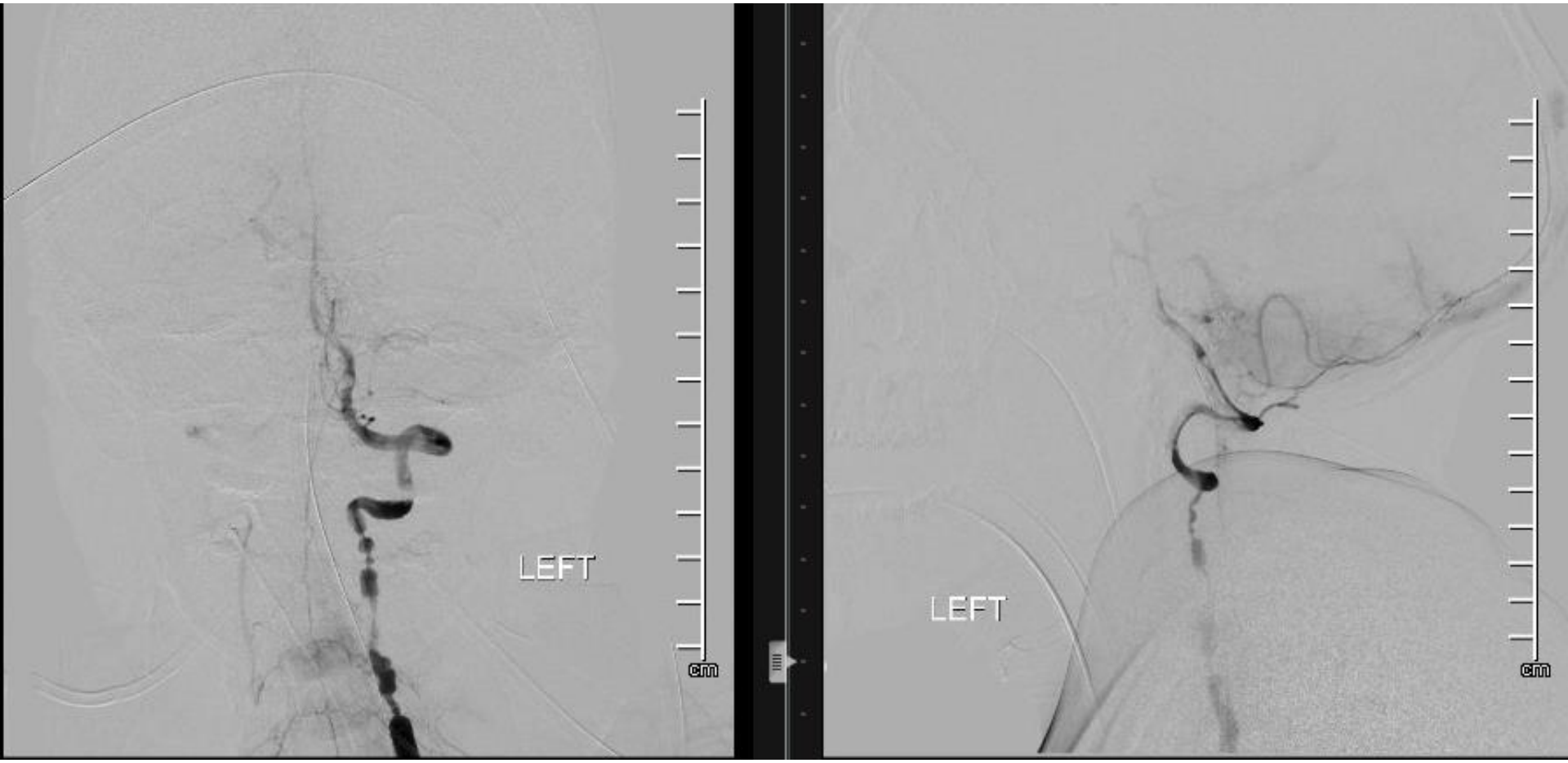
Left vertebral artery



L VA, post Tx, cervical segment



L VA post, cervical - intracranial



48 hour F/U MRA head and neck

6 month F/U MRA

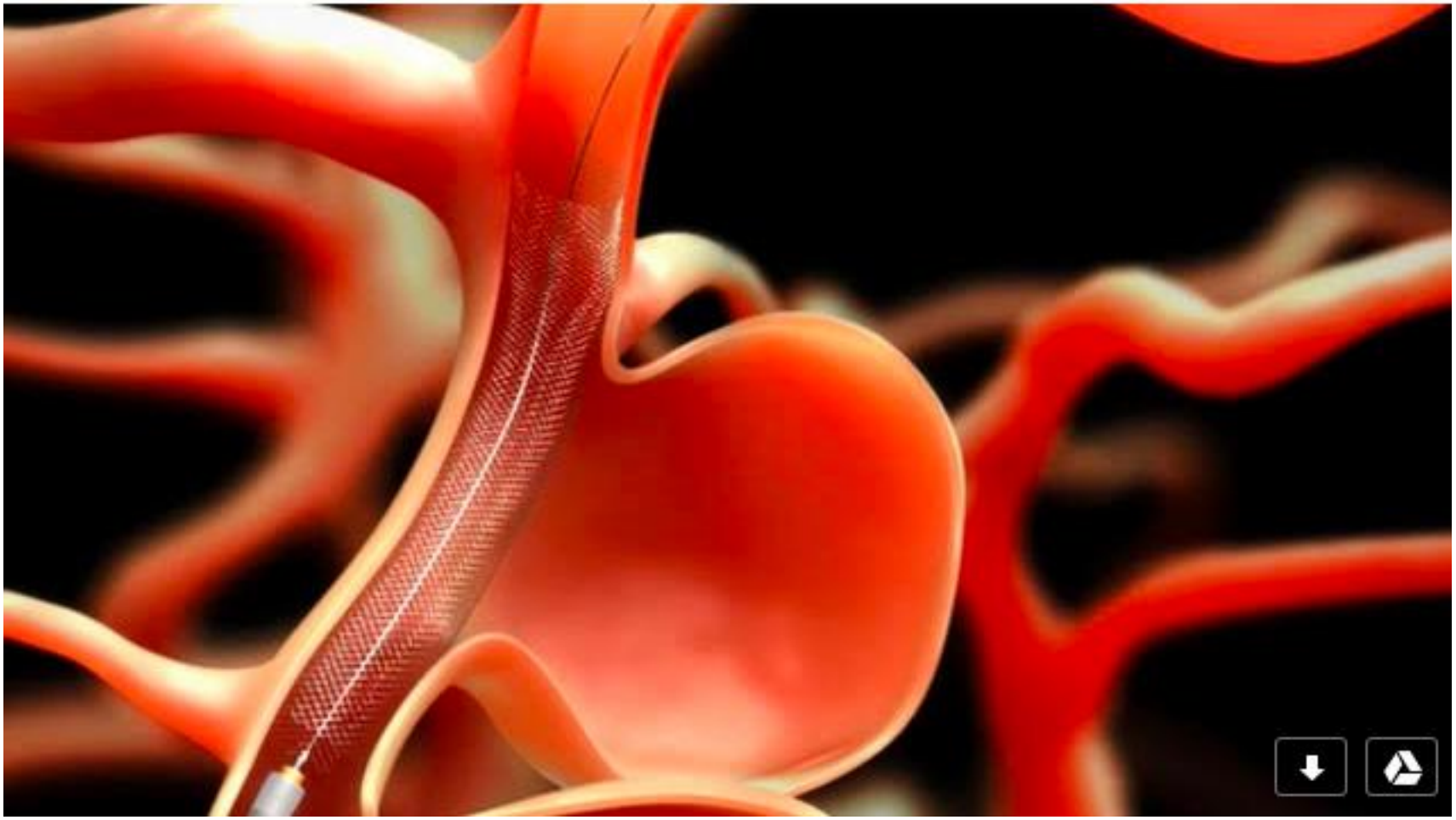
Mild L ataxic HP
Return to work

Treatment?

- Medical
- Continue antiplatelet medication
- Observation
- Risks: may be source of embolization, may grow and compress vessel
- Nat. hx: may improve

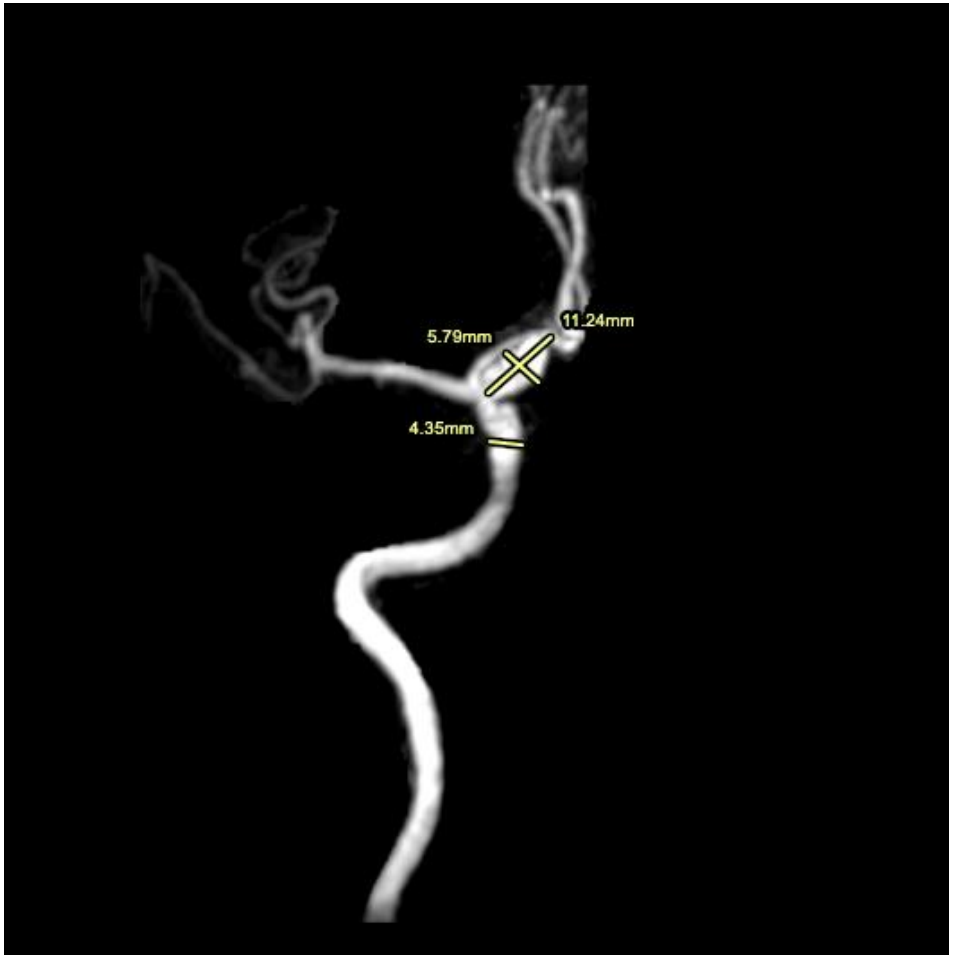
- Endovascular
- Flow diversion
- Parent vessel reconstruction
- Risks: procedure related risks (stroke, etc)
- Need to continue DAPT longer

Flow diverter



66 F w/H/A

- + FHx aneurysmal subarachnoid hemorrhage
- Large right ICA aneurysm



Treatment

- Repair
- Surgical clipping
- Endovascular treatment
  - Intrasaccular
  - Vessel reconstruction
  - endoluminal

- Observation
- Risks = risk of SAH
- Continued surveillance
- ISUIA data
- PHASES score
- UIATS score

Natural history studies

- International Study of Unruptured Intracranial Aneurysms
- 2 groups those w/prior SAH and those w/o
- Size rltd to risk of rupture
- Ant circ > 7 mm and post circ/PCOM > 5 mm higher risk in group 1
- PHASES score
- 70>age>70
- HTN (yes/no)
- Japanese/Finnish
- Size (<7, 7-10, 10-20, >20)
- Prior SAH
- Location (ICA/MCA/ACA/PCOM OR POST)

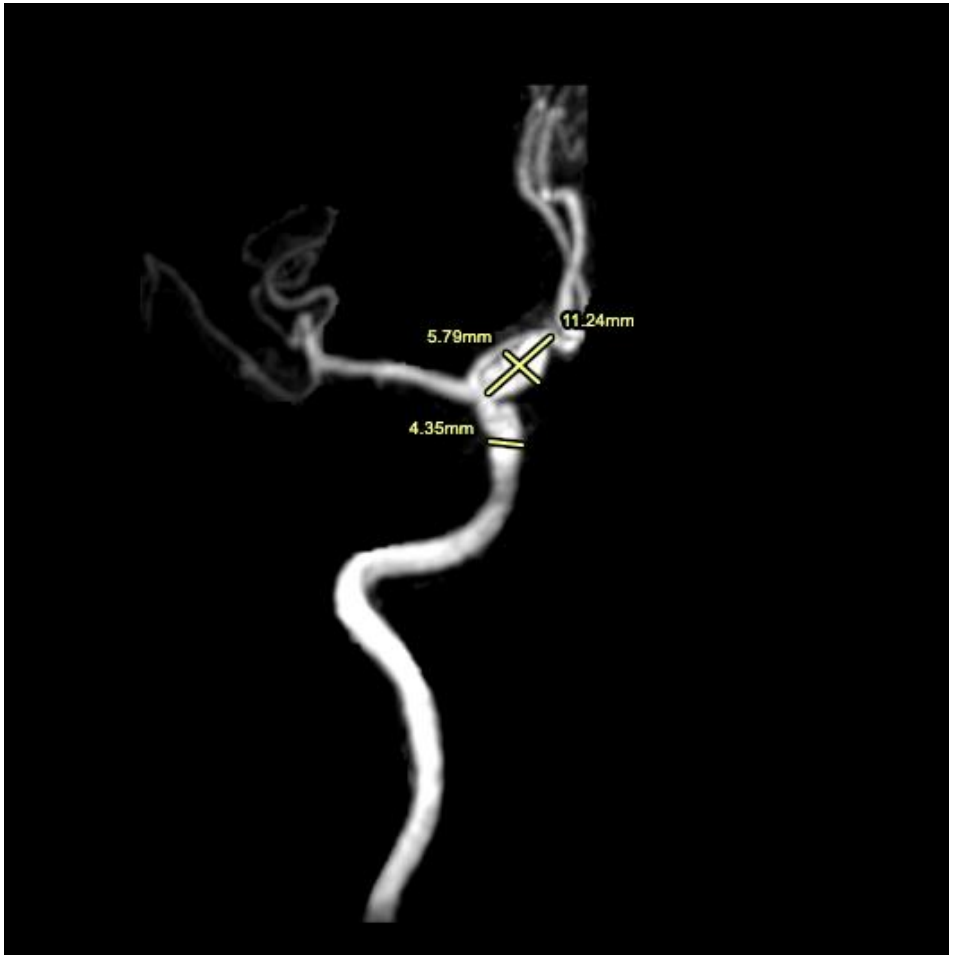
ISAT

- Surgery vs endovascular treatment for ruptured aneurysms
- No comparison data for unruptured aneurysms

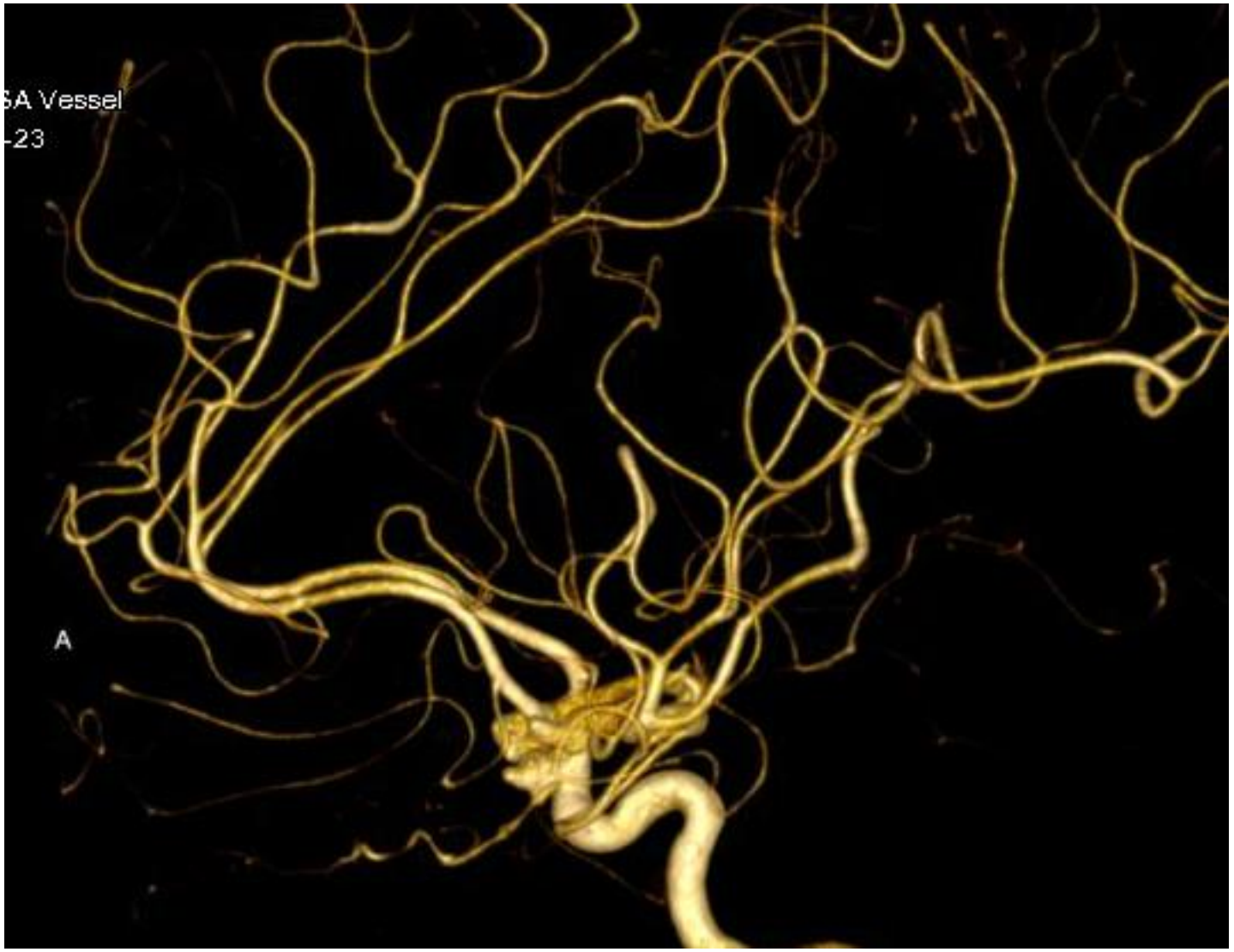
Coil compaction, recanalization

66 F w/H/A

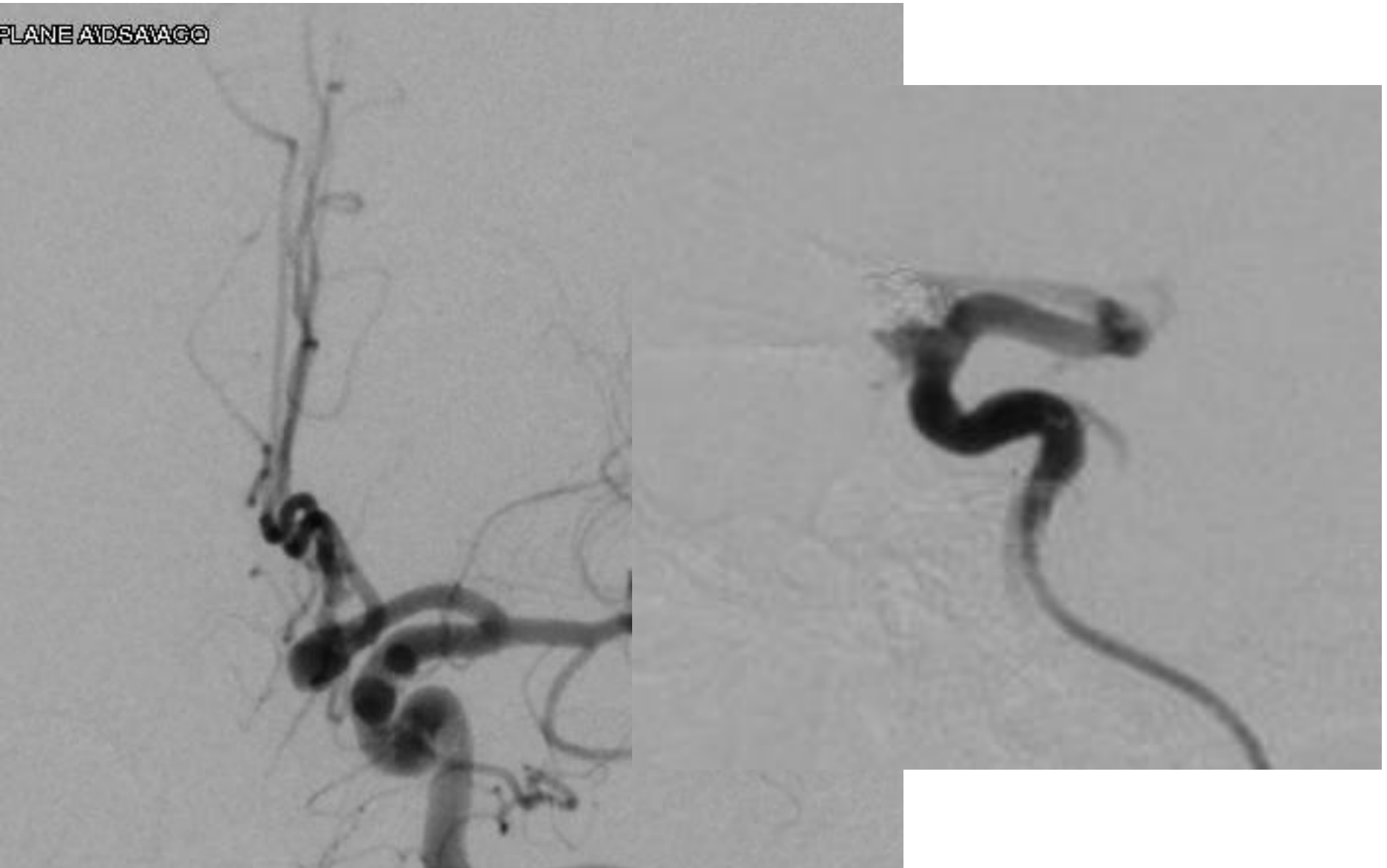
- WHOL
- CT, SAH, Fisher III
- Hunt and Hess grade III



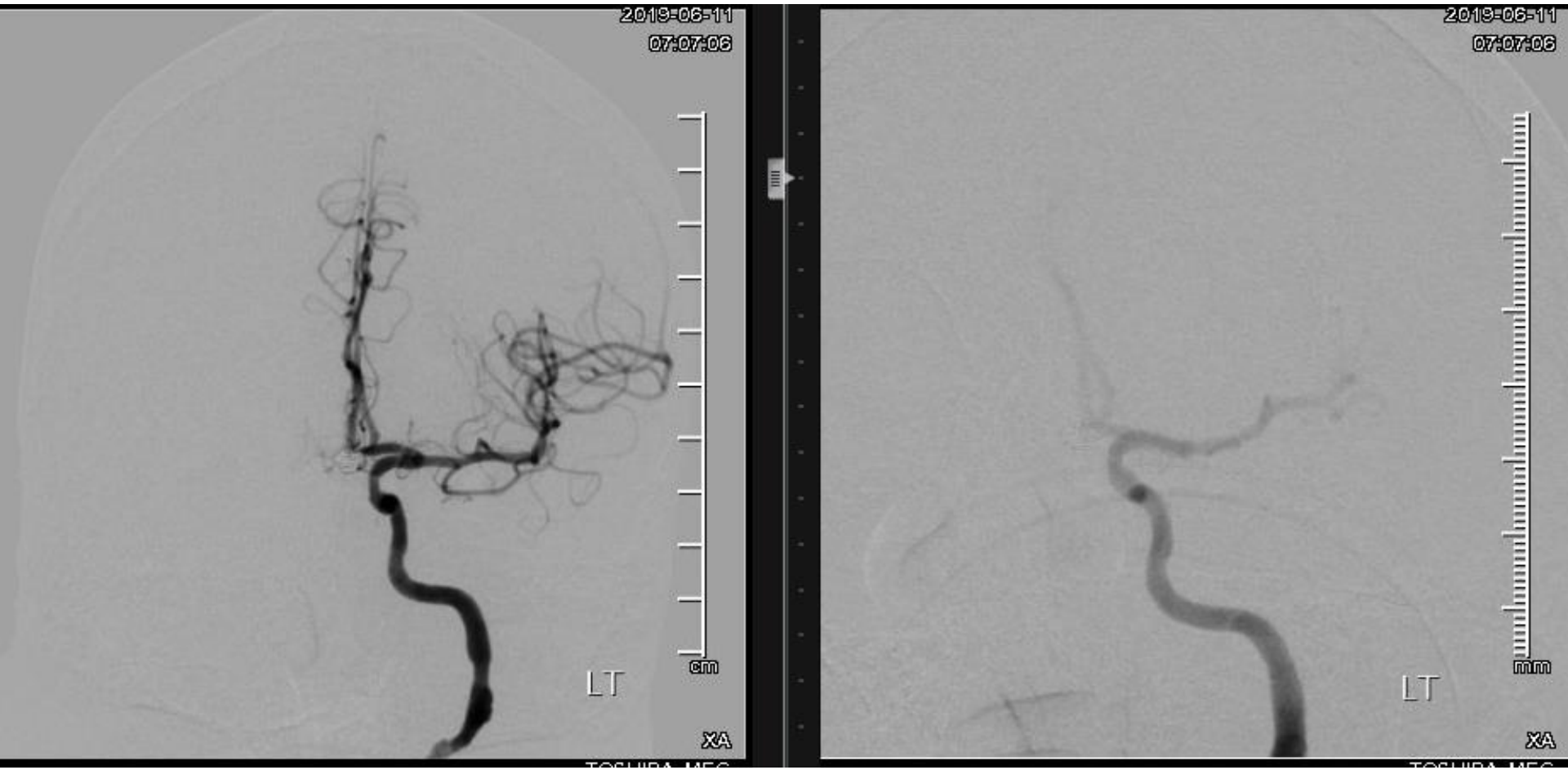
57 incidental multiple IAs



L ICA, PRE TX



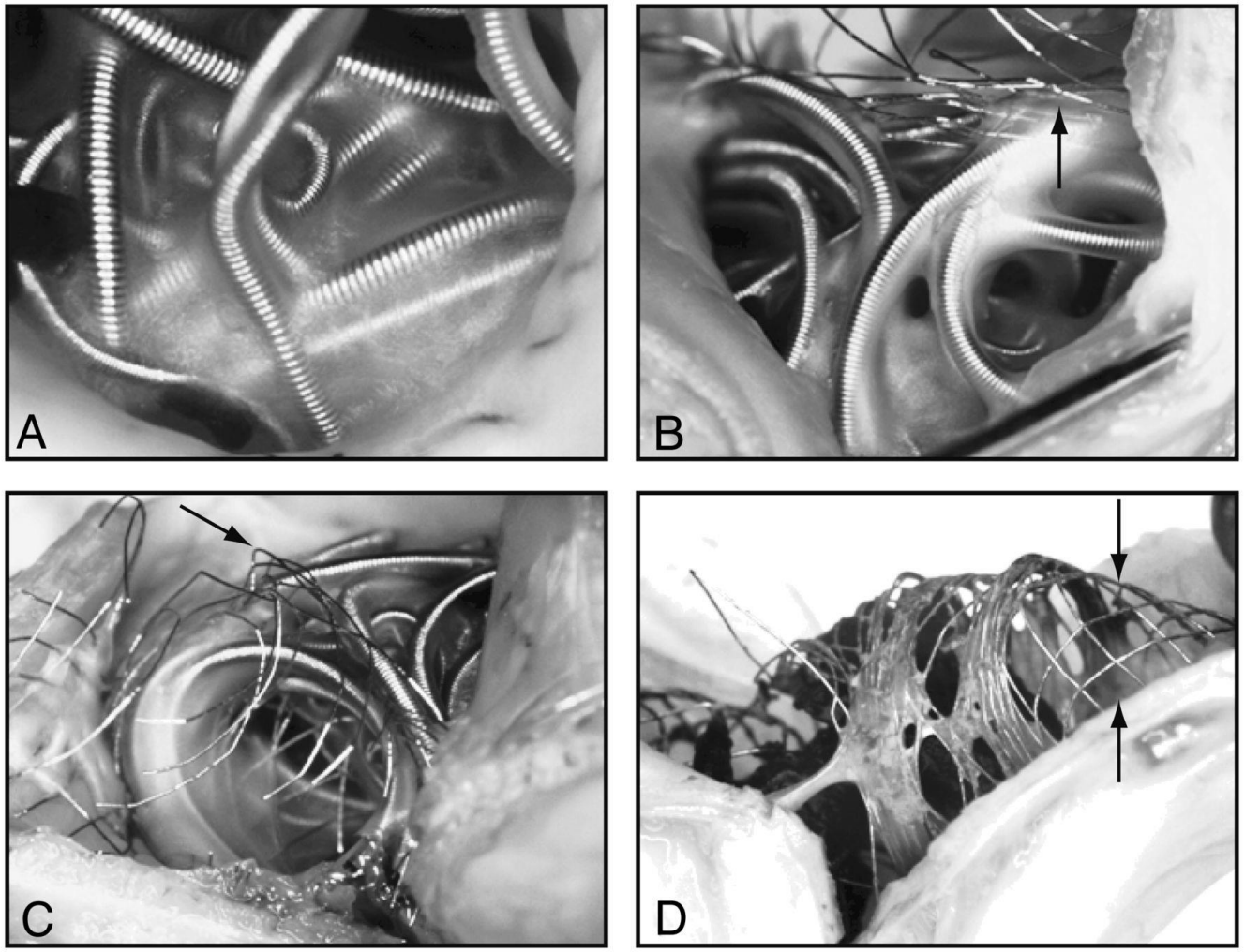
6 MO FU



Intrasaccular thrombosis

- MacDonald et al, *Stroke*, 1998; 29: 478-486

Neointimal closure of aneurysm necks.



J. Raymond et al. AJNR Am J Neuroradiol 2013;34:570-576

Endothelialization

- MacDonald et al, ctd

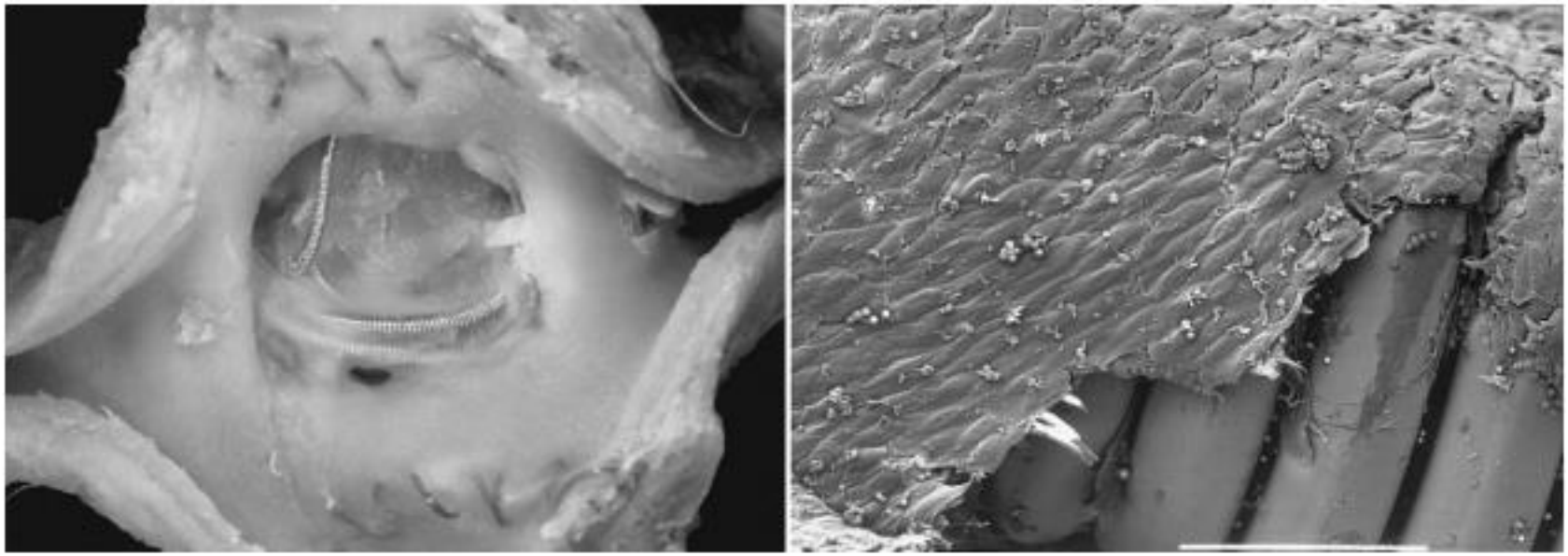
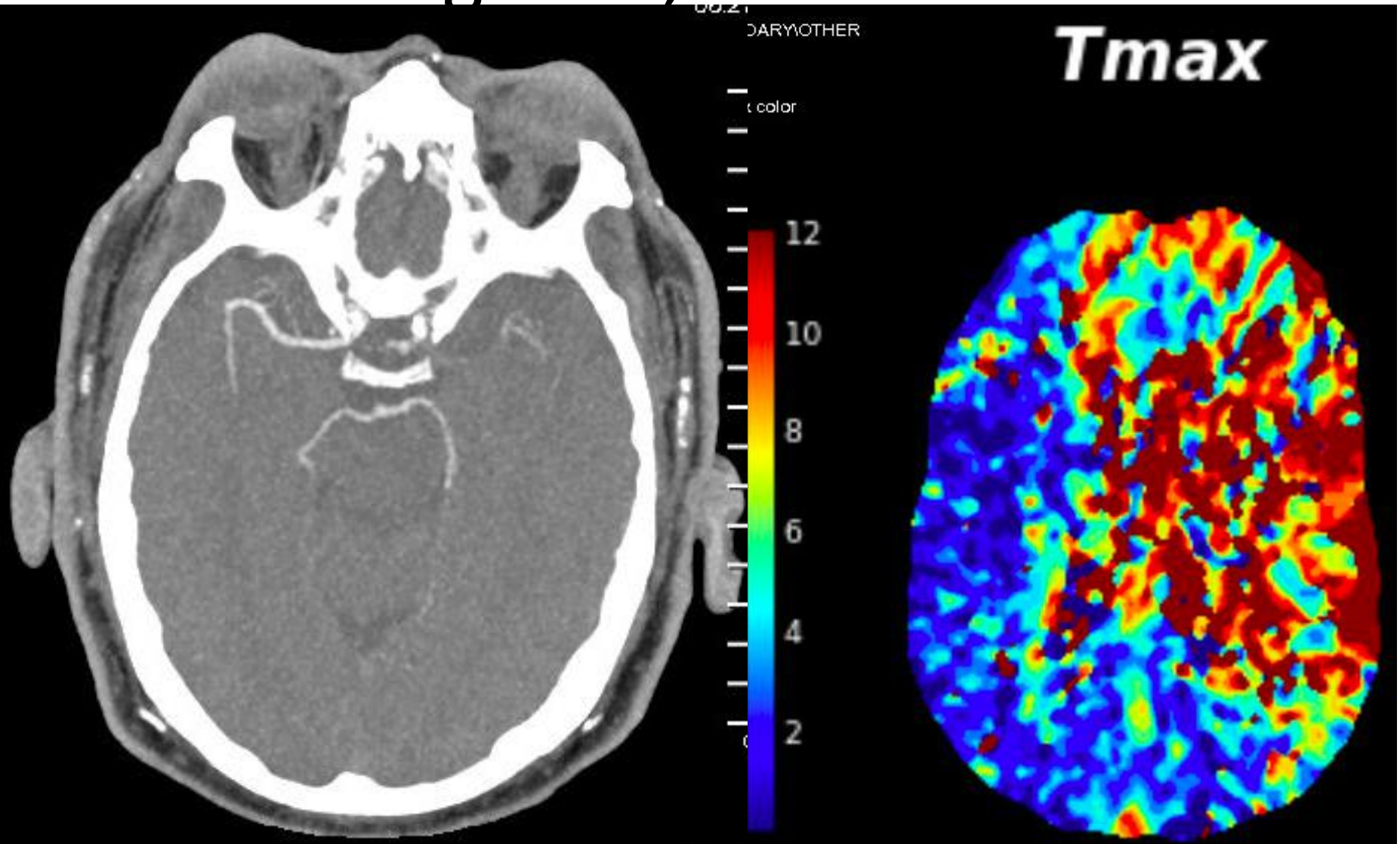
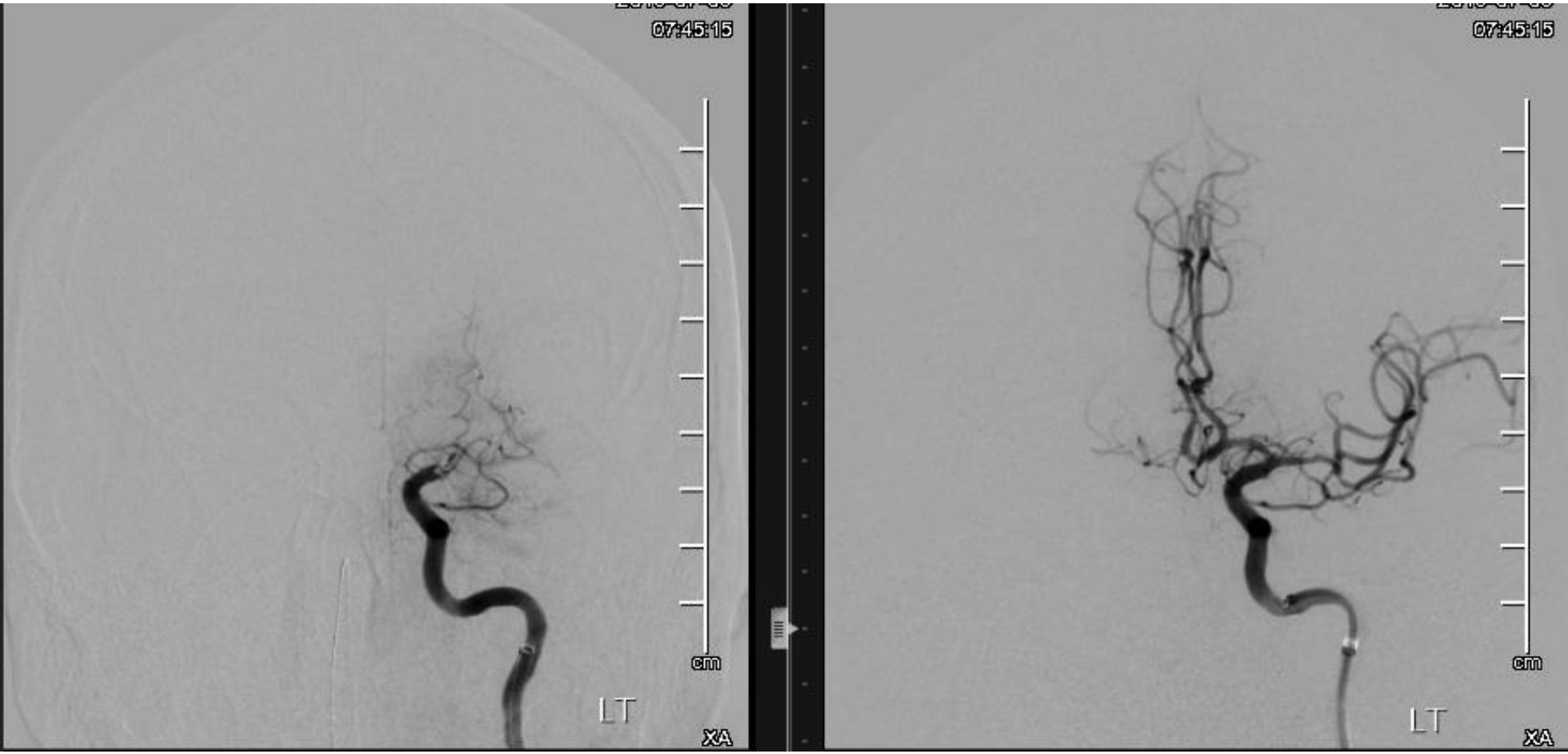


Figure 7. Photograph (left) of mouth of a terminal aneurysm treated with Guglielmi detachable coils 2 months previously, showing filling of the aneurysm with fibrous tissue. Coils still protrude through the connective tissue mass, which does not extend flush with the arterial wall. Scanning electron microscopy (right) shows coils covered with a discontinuous layer of endothelial cells (bar=100 μm).

78 M, AFIB, △ MS > 8 hours, CT brain negative, NIHSS>20

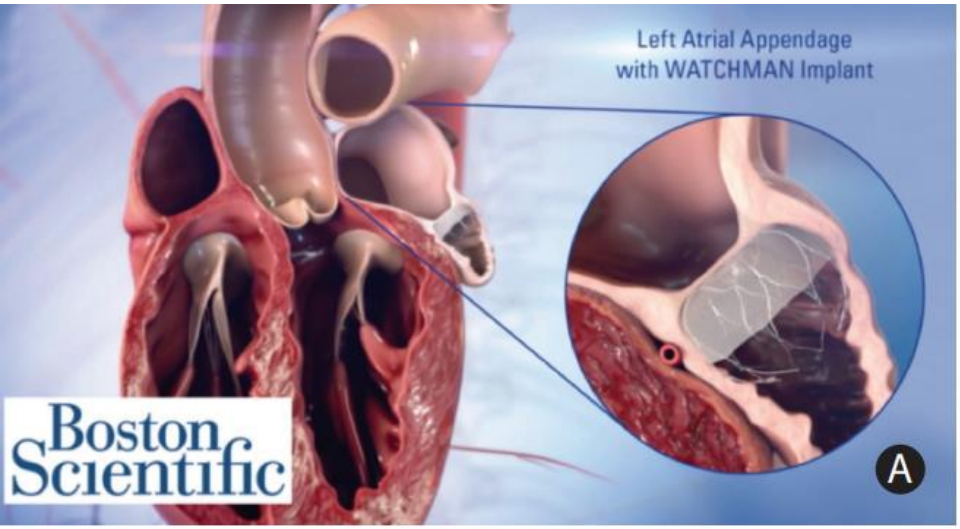


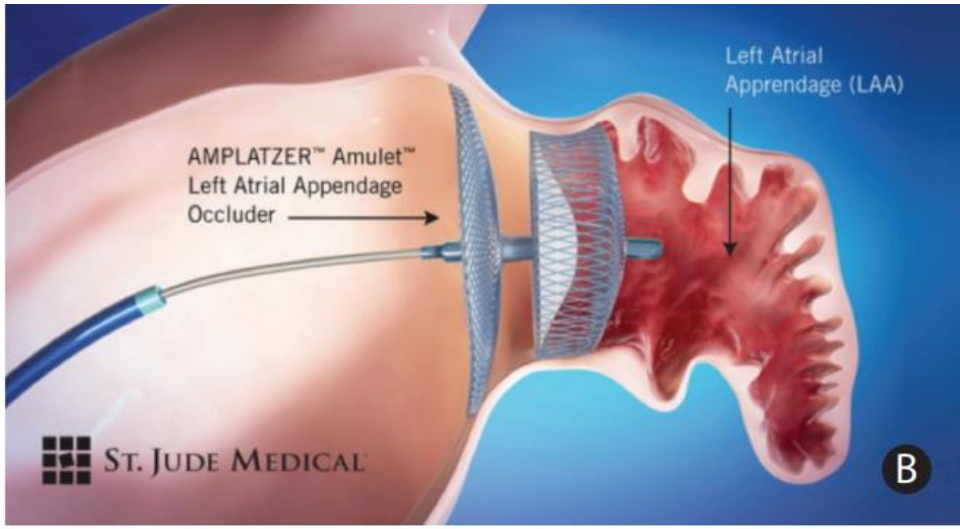
L ICA pre/post Tx

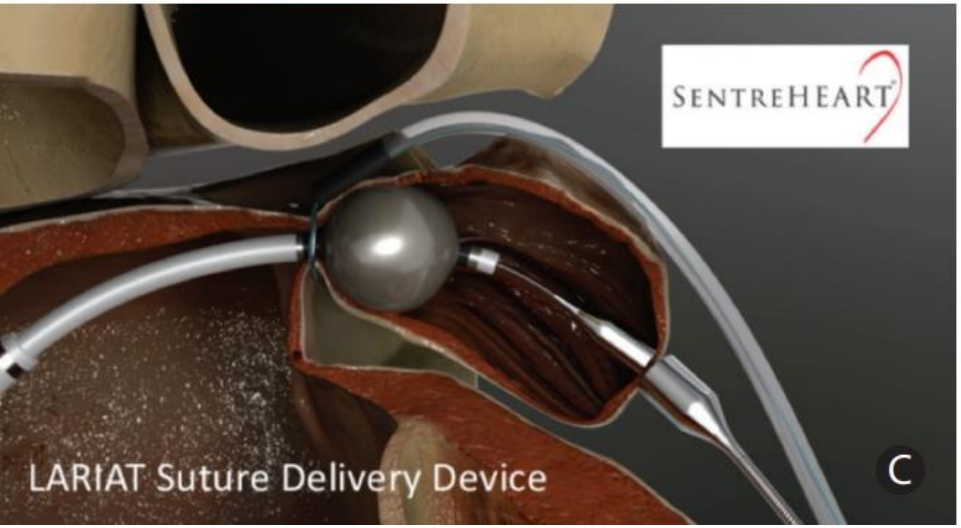


Secondary prevention

- Carotid repair?
- CEA vs CAS?
- Atrial appendage closure?

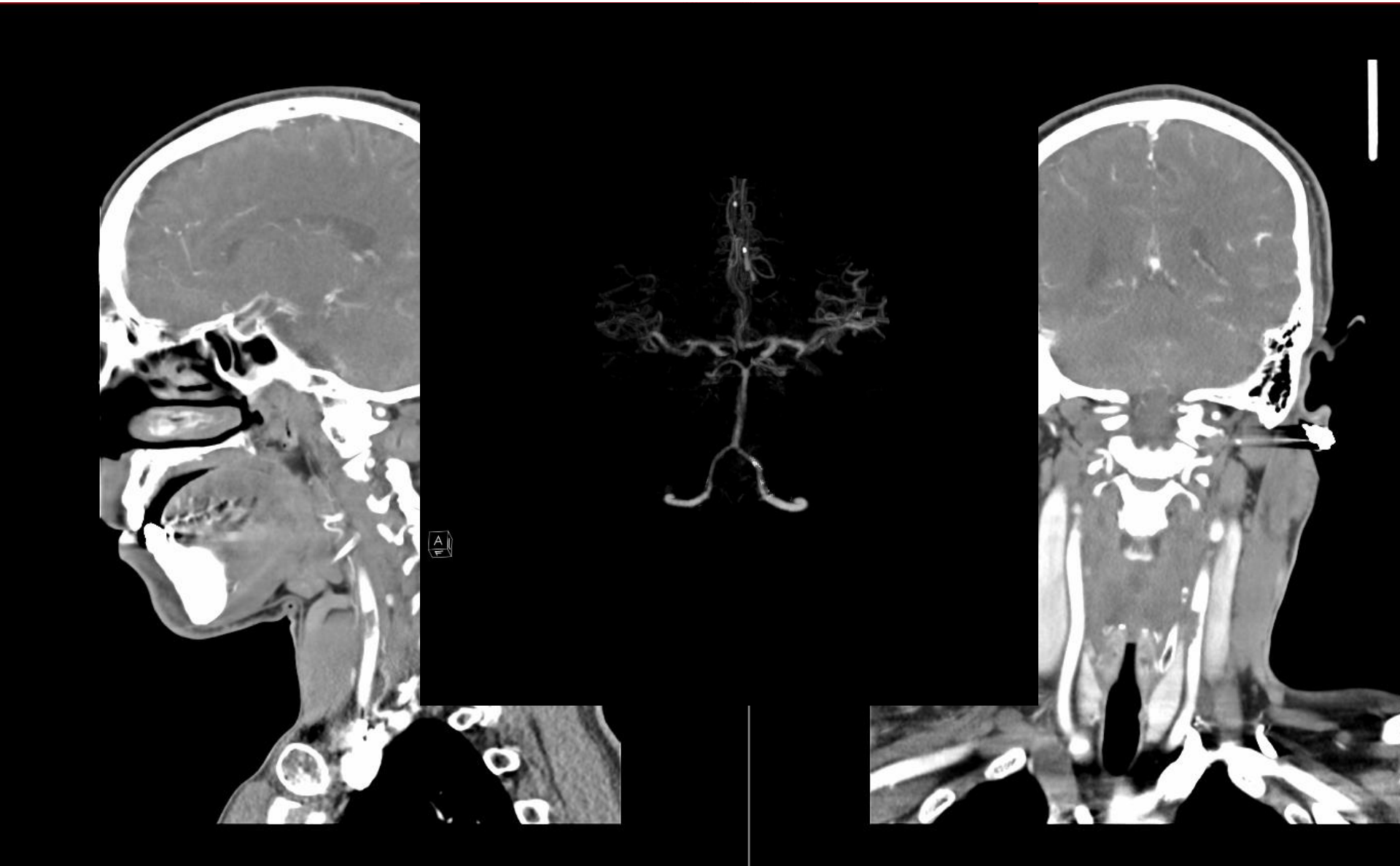

Left Atrial Appendage
with WATCHMAN Implant
Boston Scientific
A


Left Atrial
Apprendage (LAA)
AMPLATZER™ Amulet™
Left Atrial Appendage
Occluder
ST. JUDE MEDICAL
B

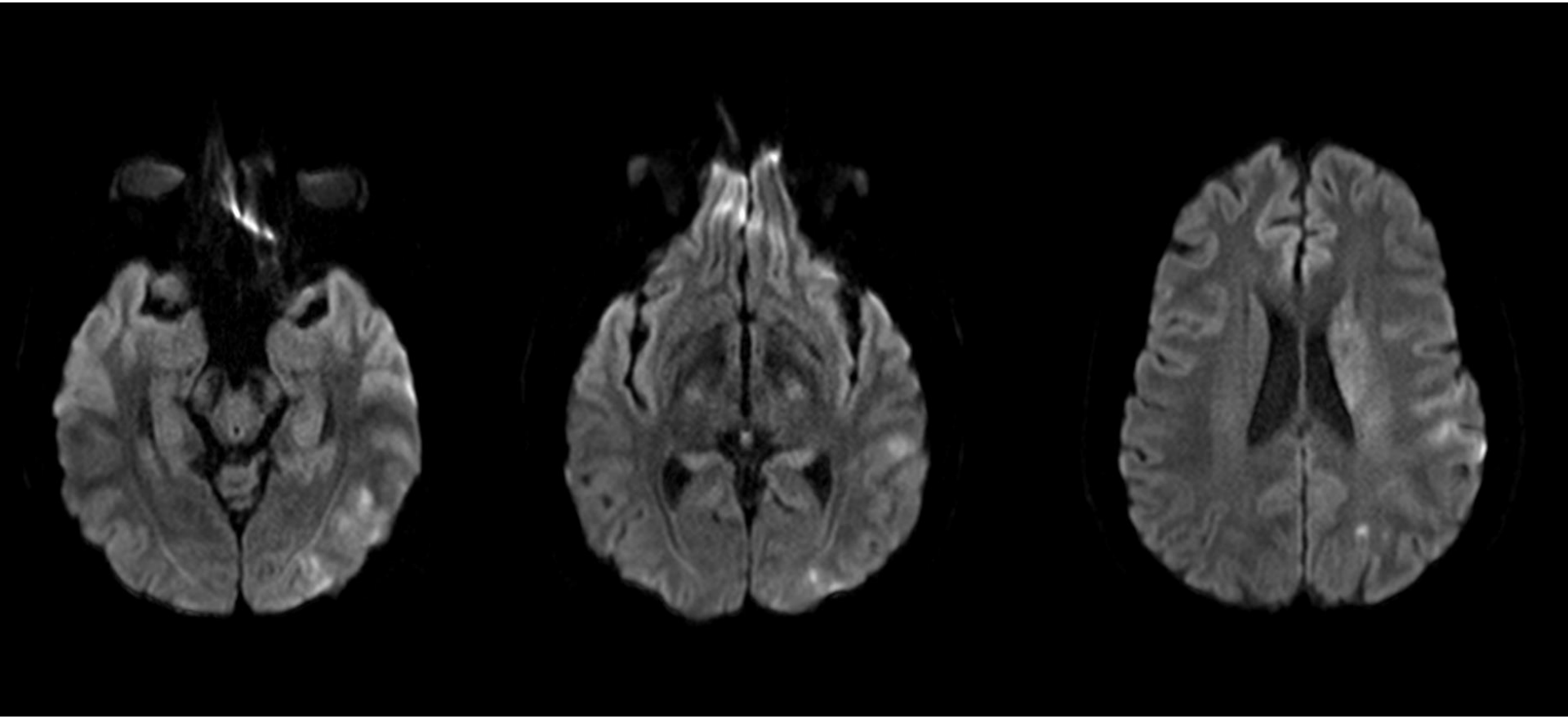

SENTREHEART
LARIAT Suture Delivery Device
C


AtriCure
ATRICLIP LAA Exclusion System
D

54 M R HP and aphasia



initial brain MRI

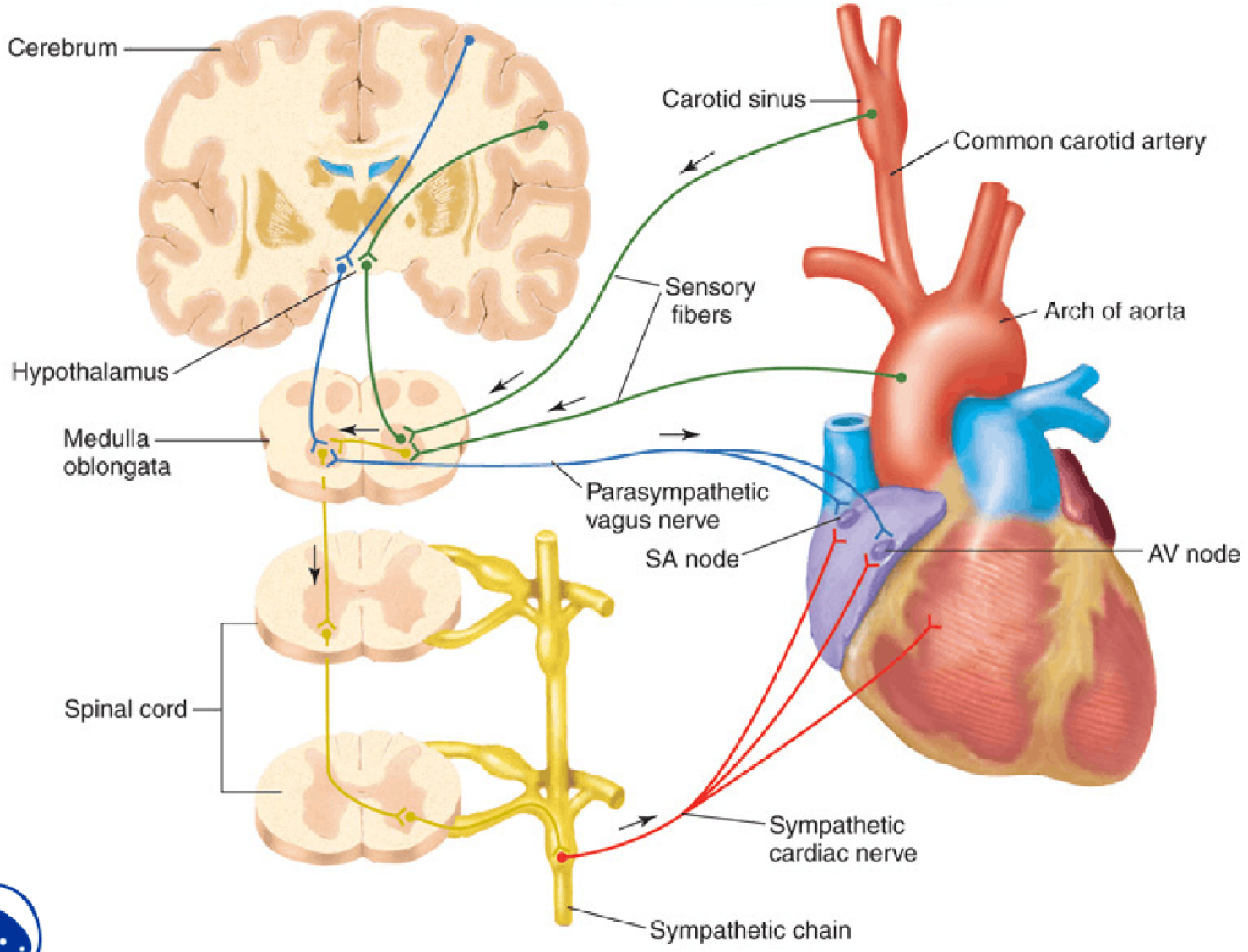


Treatment

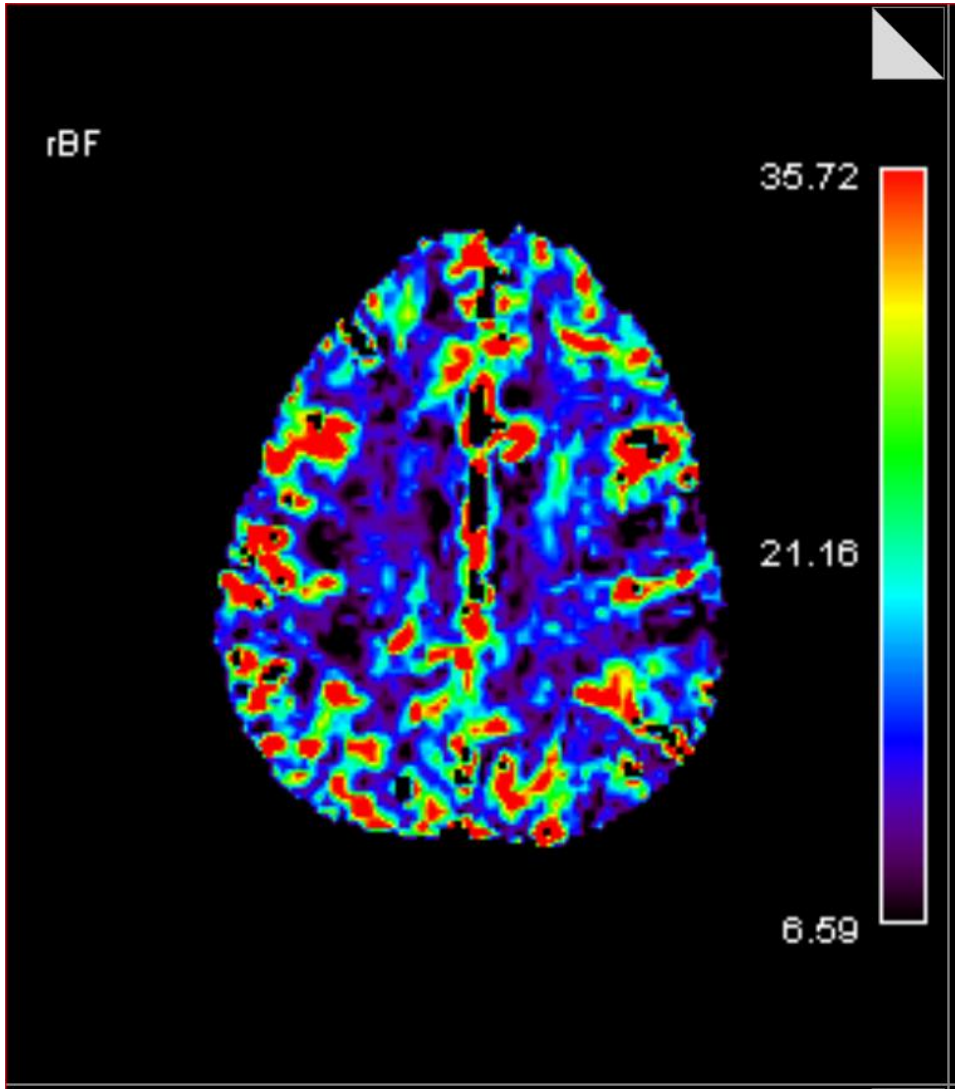
- Carotid repair
- CEA vs CAS
- Risks acute worsening
- Hypotension (w/CAS)
- RPH

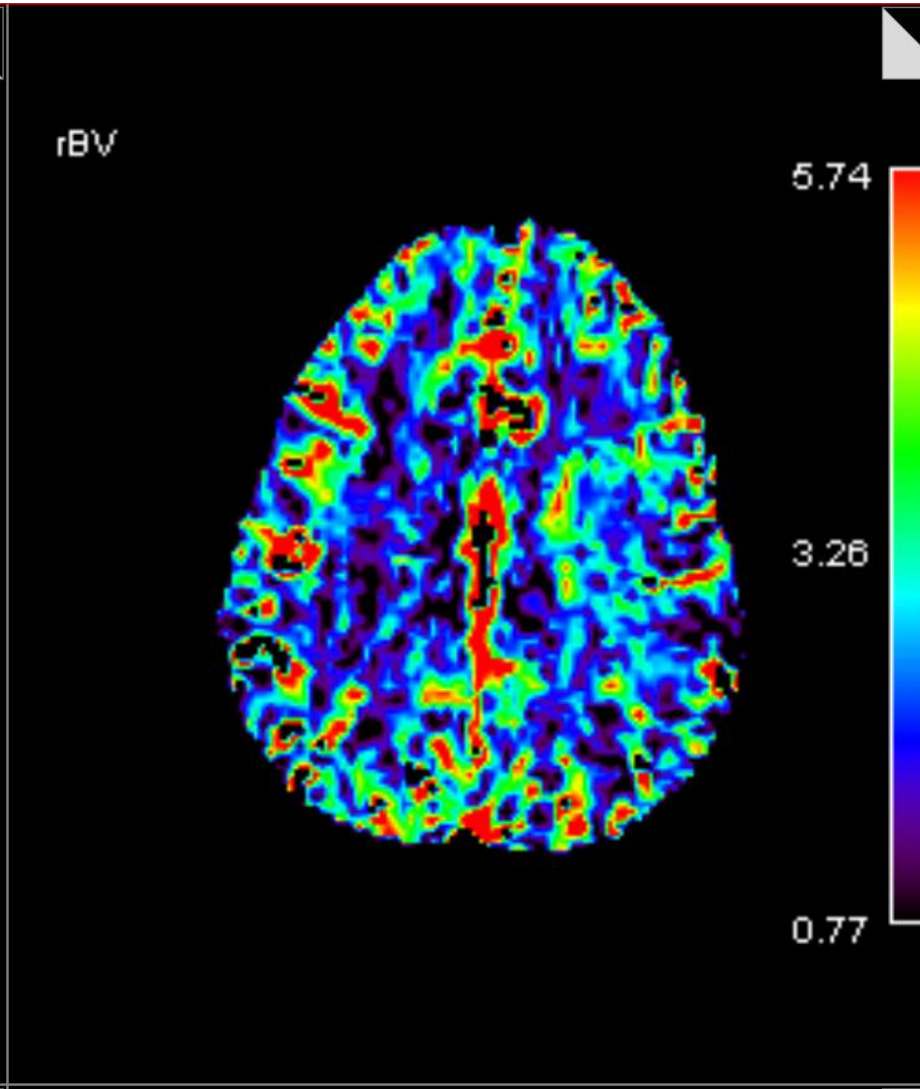
- Medical management
- No procedural risk
- Stroke expansion?

Carotid baroreceptor reflex



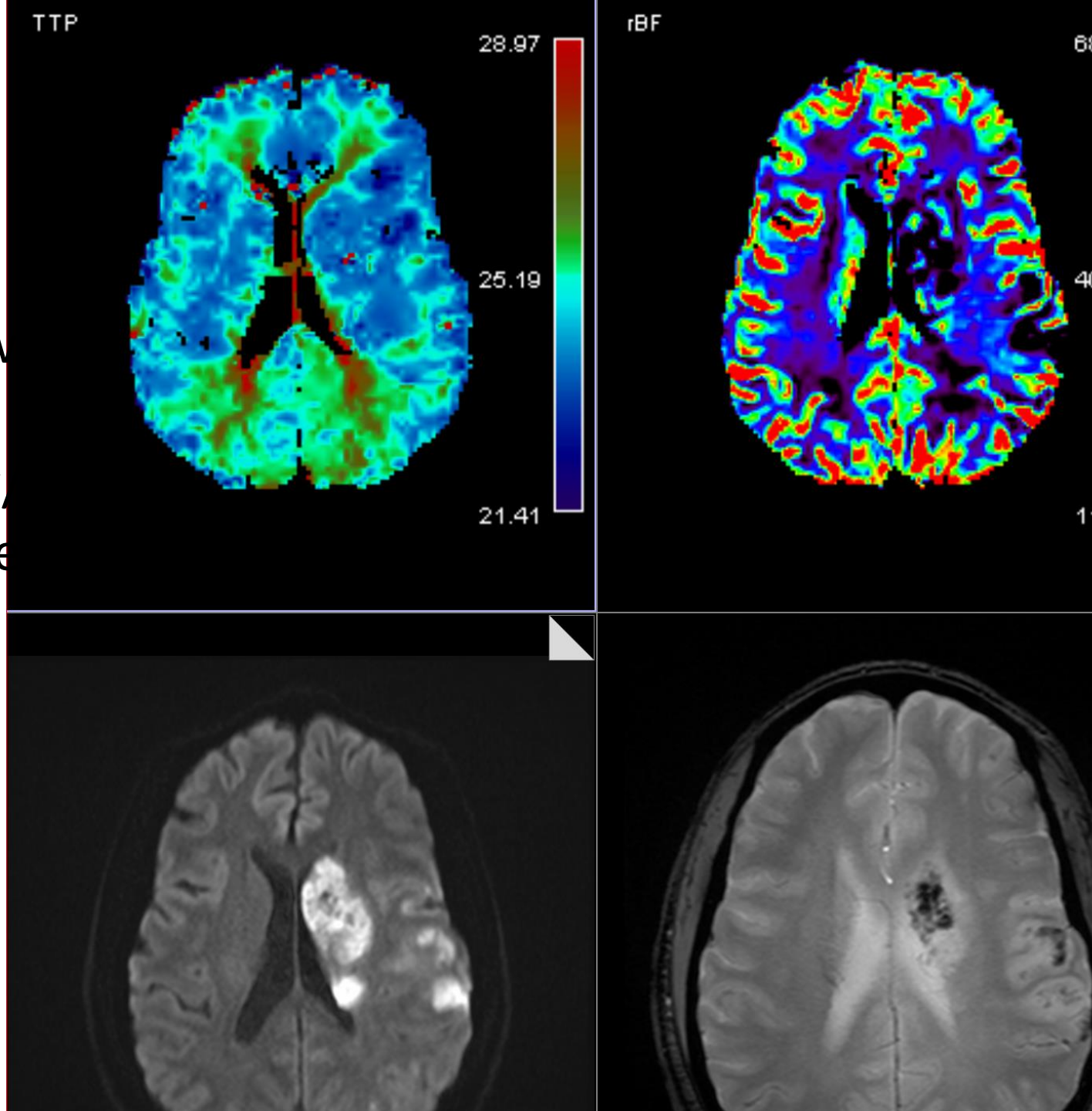
initial CTP (next day)





planned for elective CAS

F/U brain MRI brain and MR perfusion show extension of stroke to BG w/ ICH so no acute Tx done

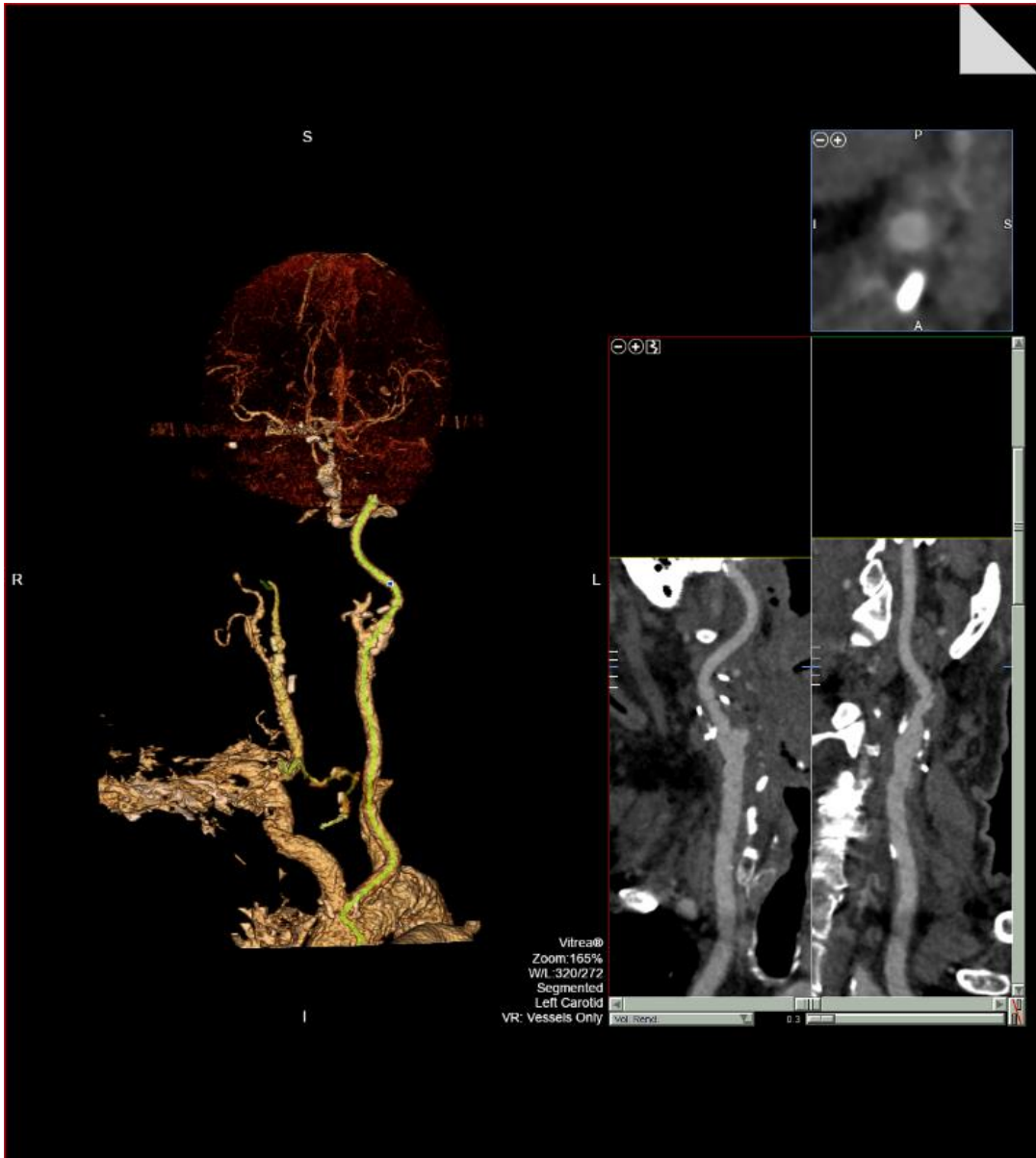


Outcome: final HCT, improving R HP and aphasia

78 M R HP, CTA axial shows no R ICA at skull base and sag shows fetal R PCA

CTA

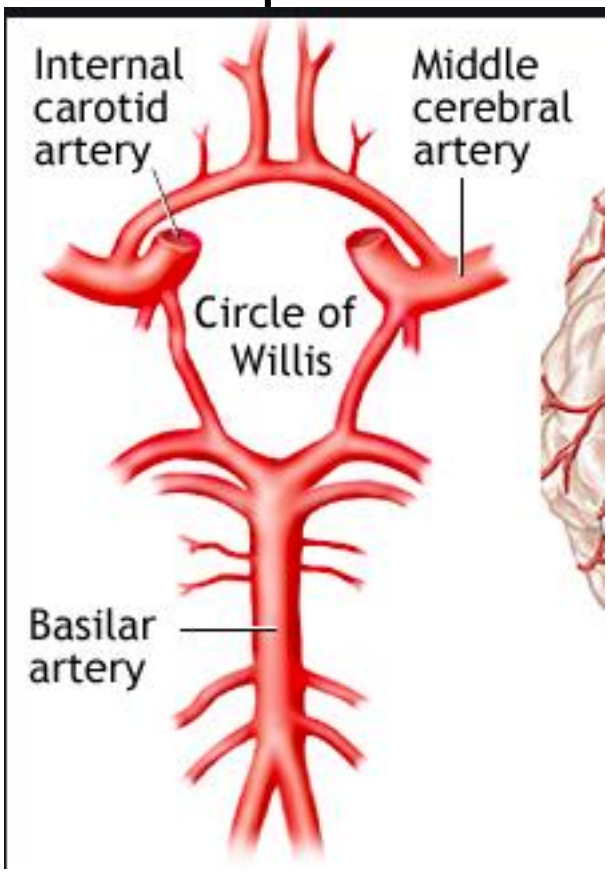
- intracranial CTA, no occlusion



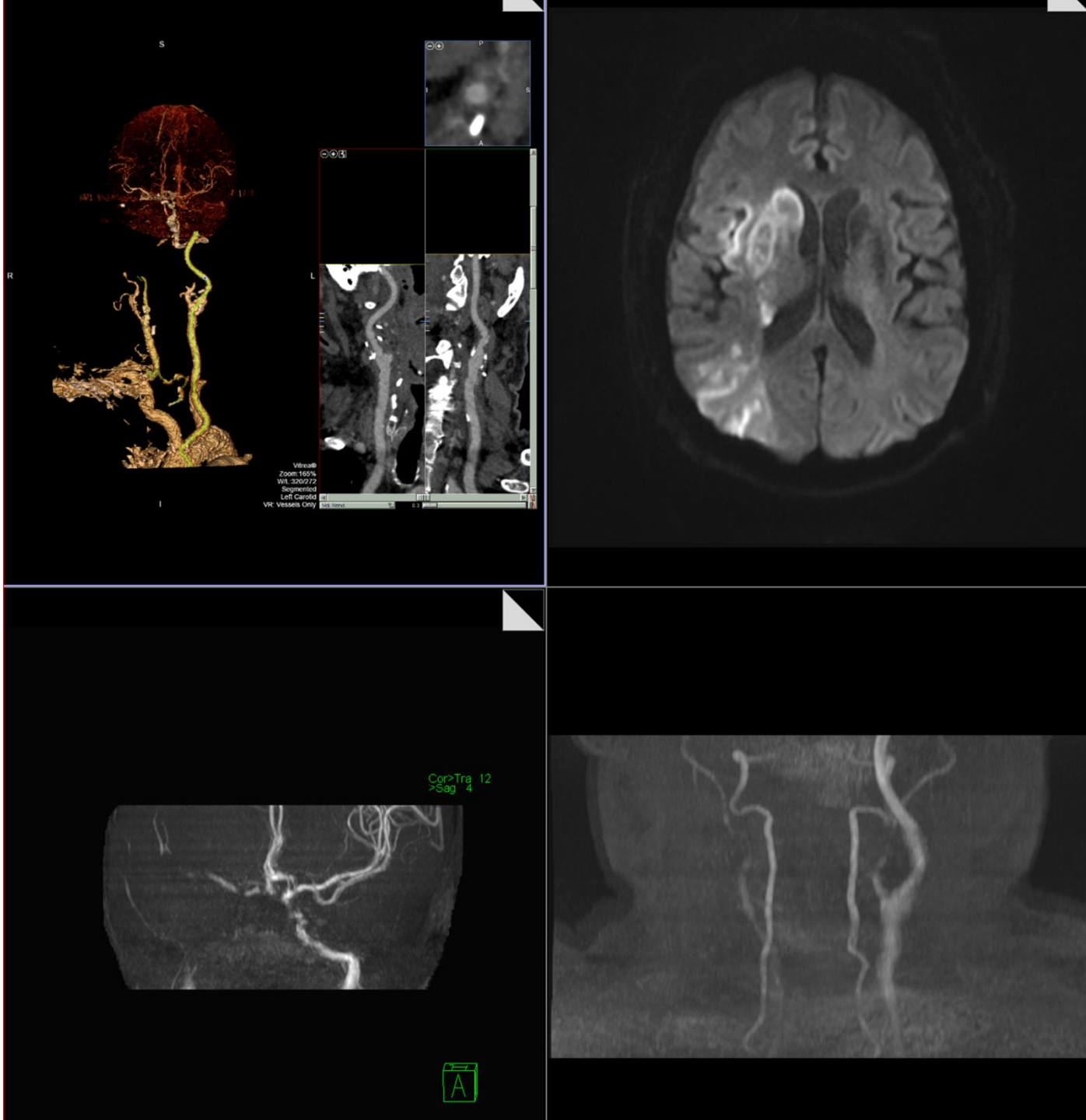
Treatment dec

- <u>Carotid revascularization</u>
- Non surgical case
- Endovascular stenting w/ ??coronary stent
- Risk may worsen open intracranial circultaion

- <u>Medical mgt</u>
- Relies on competent CoW



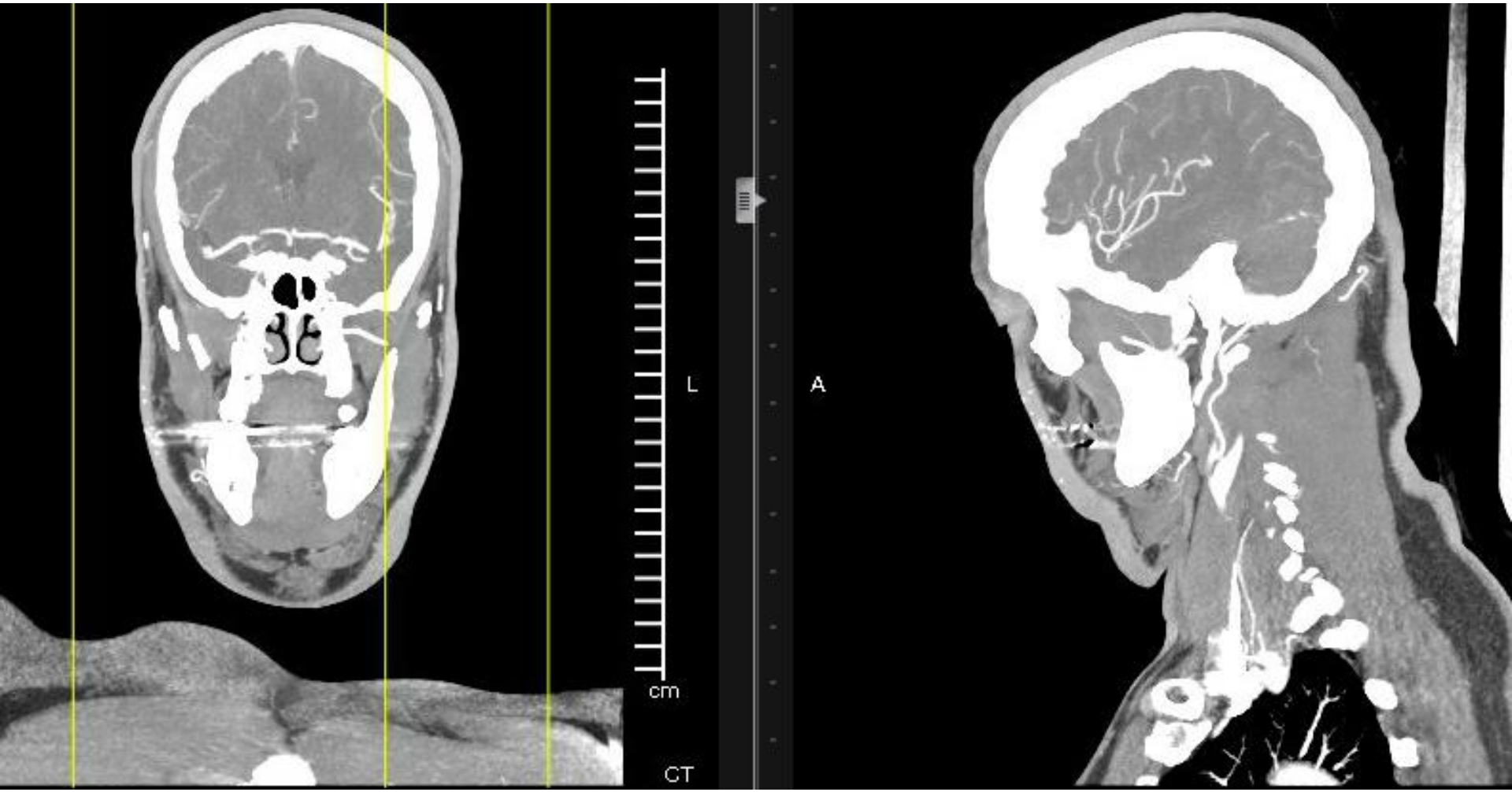
- Patient 9, MRI next day
- Ultimately expired in hospital



51 M with R HP and aphasia

- Stroke about 3 years prior, left sided weakness, no vascular imaging done
- CT brain: old R parietal stroke, no acute stroke
- CTA brain: no LVO
  CTA neck: L ICA occlusion

CTA head and neck



Endovascular treatment

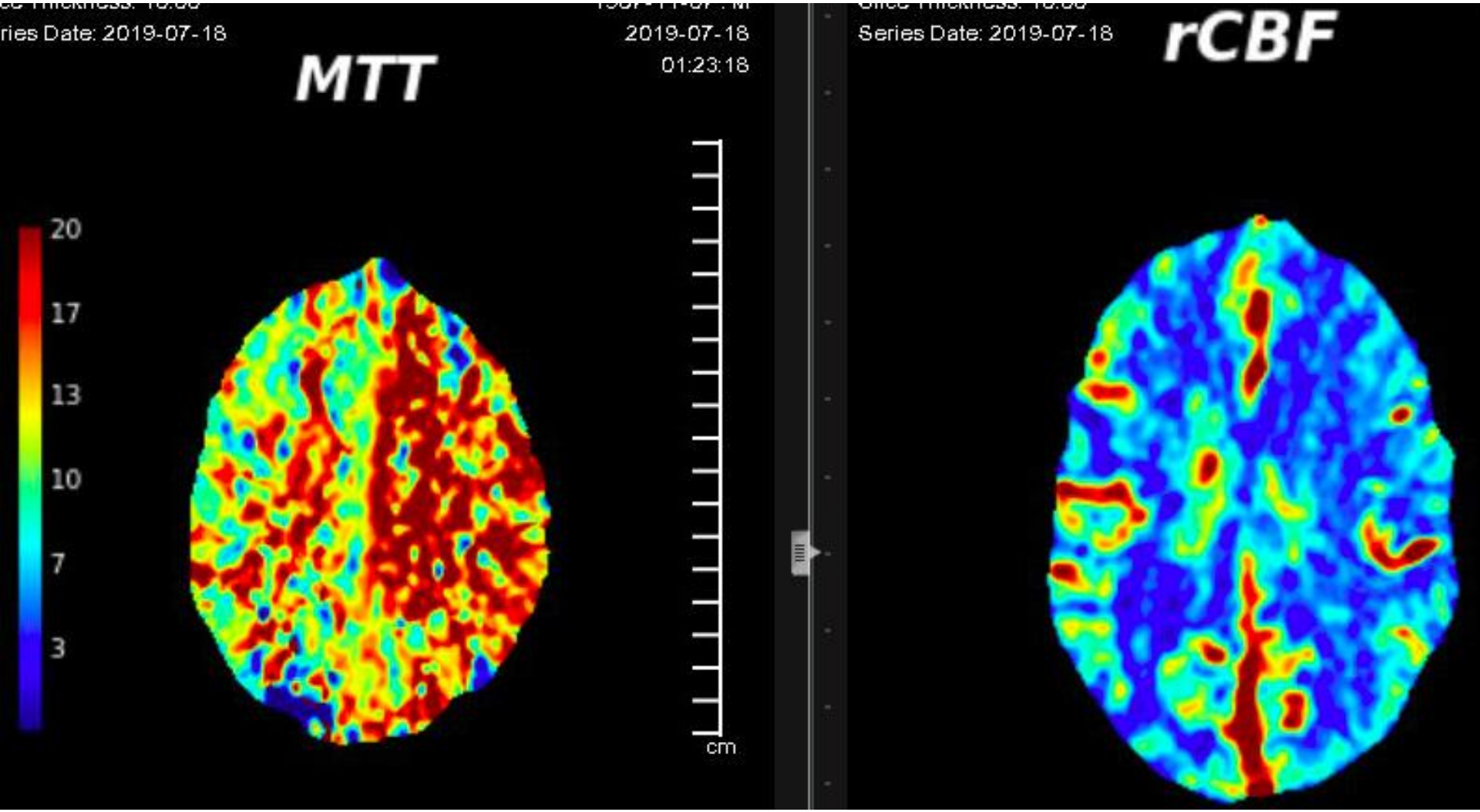
Pros

- Revascularize forward flow

Cons

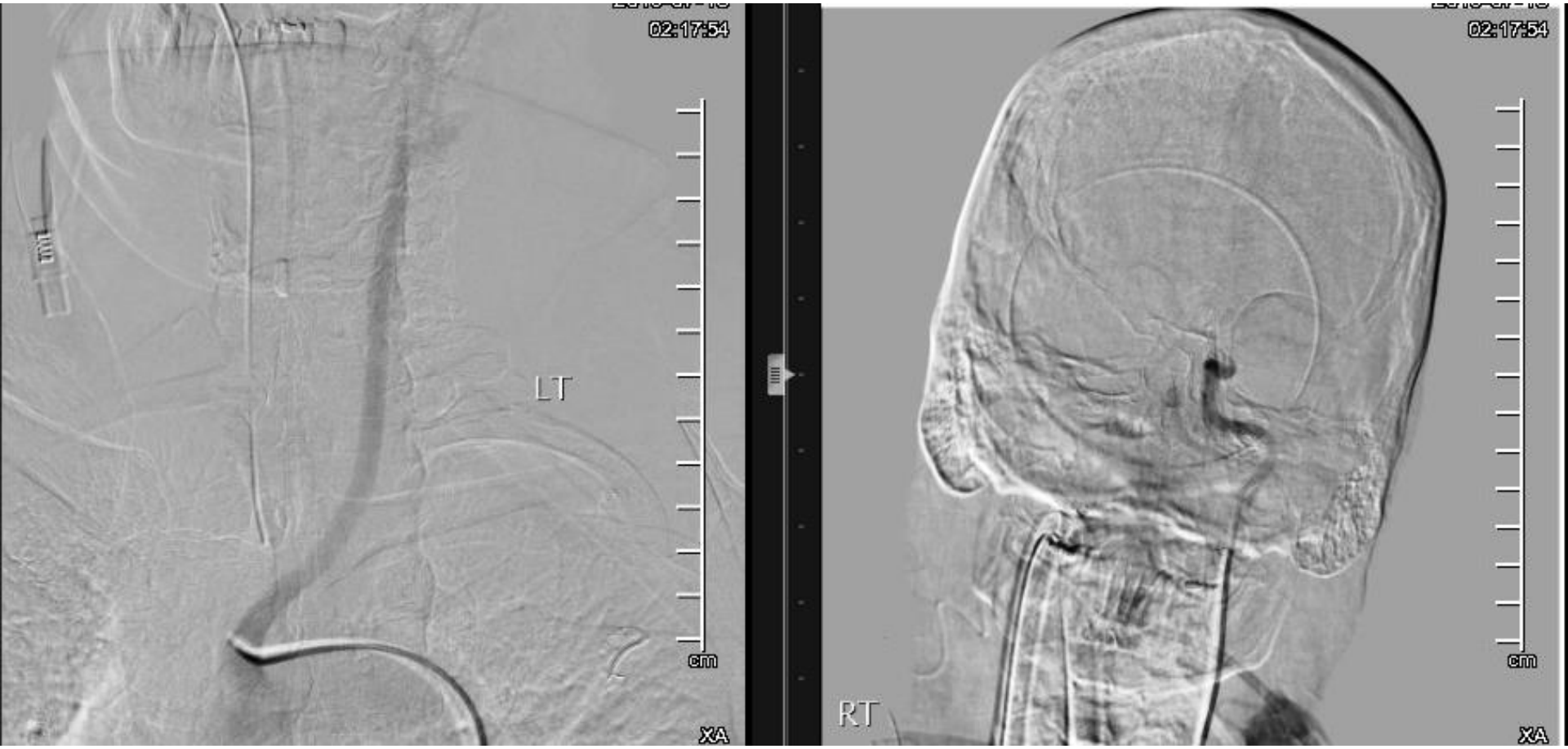
- No LVO, risks of treatment (bradycardia, hypotension)
- Other attendant risks of angiography
- Carotid stenting may require dual antiplatelet therapy contraindicated in acute TPA setting

CT perfusion

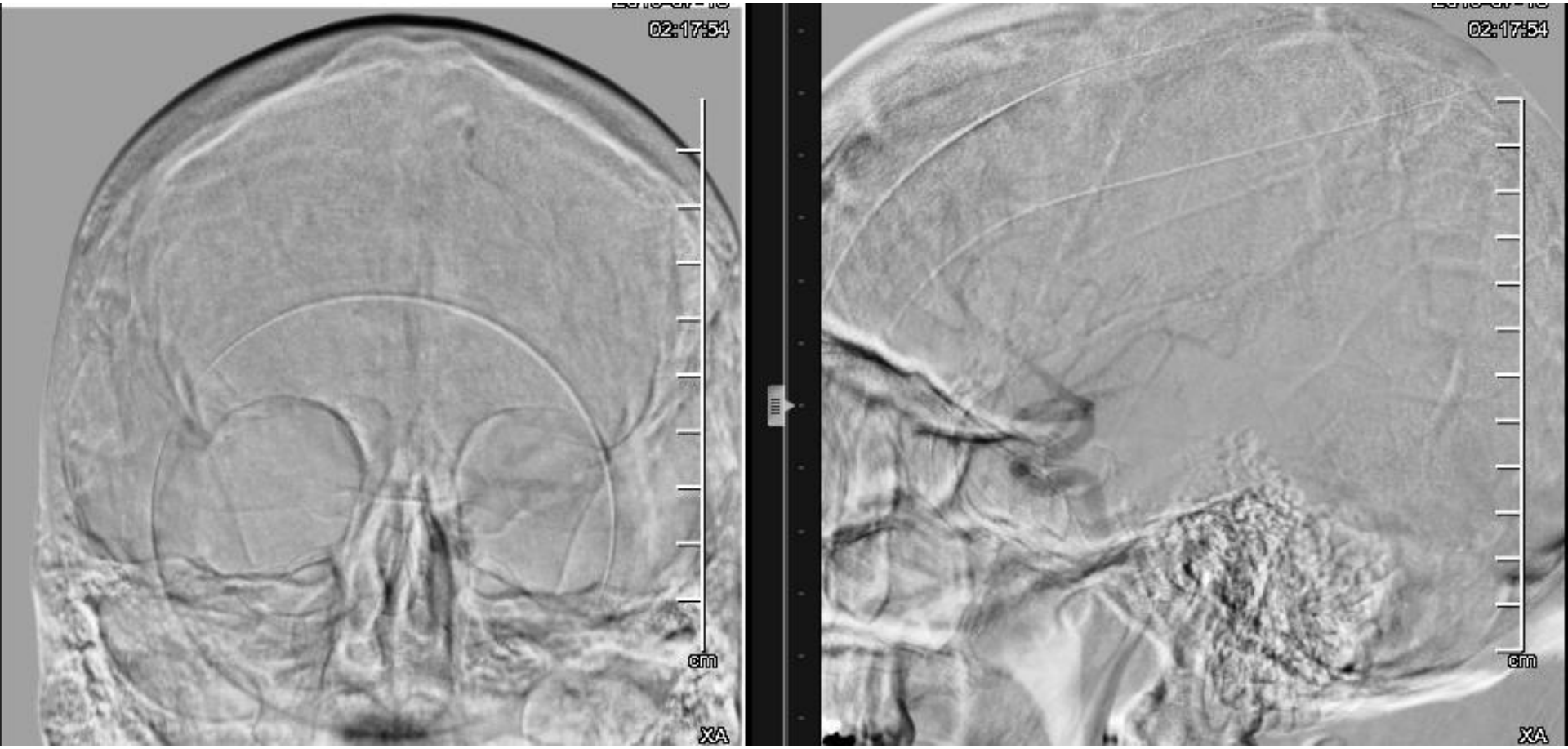


Evaluation of CoW

L CCA/ICA Angiogram



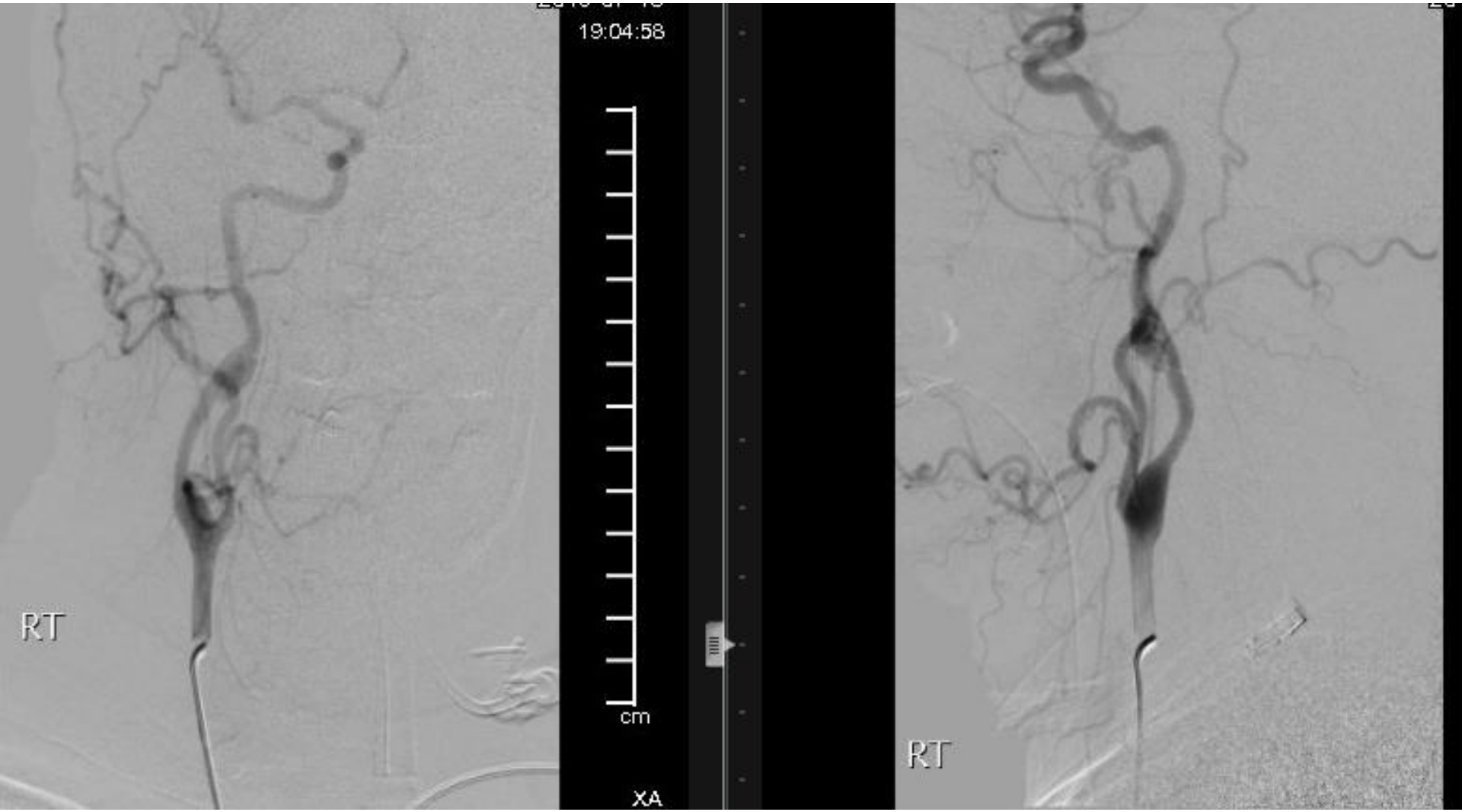
Intracranial view



Intracranial patency but no antegrade flow

Post thrombectomy and stent

R CCA



Take home points

- Mild symptoms can still be major strokes
- Atypical presentations may still be strokes
- Penumbral imaging may help in decision making in subtle clinical syndromes, other factors
- Need to know collateral circulation for extracranial disease