

# AMSER Case of the Month

## September 2023

47-year-old female with left-sided weakness and a history of stroke  
and prior motor vehicle accident

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# Patient Presentation

## History:

- 47-year-old black female with a history of:
  - 4 months of intermittent sciatica, left-hand pain, and left-sided arm and leg weakness and numbness following a motor vehicle accident (MVA) 4 months prior
  - Patent foramen ovale
  - Stroke in R MCA distribution occurring 1 month prior and resolution of occlusion s/p IV TPA
- Presenting for evaluation of left-sided weakness and a potential source of stroke.

# Patient Presentation

## Physical Exam Findings:

- Finger tapping slower on the left than right
- Cranial nerves intact
- Full strength in deltoids, biceps, triceps, hip flexors, knee flexors and extensors, and foot dorsiflexors
- Normal gait

# Pertinent Labs

- A1C 5 (nl 4.2-5.6%)
- LDL 72 (nl <100 mg/dL)
- HDL 77 (nl 40-60 mg/dL)
- ANA neg.

What Imaging Should We Order?

# Select the applicable ACR Appropriateness Criteria

Upon initial admission for treatment of suspected stroke 1 month prior to the current presentation, the patient had already received imaging confirming stroke in R MCA territory and appropriate treatment.

**Variant 4:** New focal neurologic defect, fixed or worsening. Longer than 6 hours. Suspected stroke.

Radiologic Procedure	Rating	Comments	RRL*
MRI head without IV contrast	8	Parenchymal brain imaging and CT or MR vascular imaging of the head and neck should be considered. Noncontrast head CT is often obtained first to assess for hemorrhage or large infarct. Can be useful if there is a contraindication to contrast. MRI is more sensitive than CT for acute infarct.	○
MRI head without and with IV contrast	8	Parenchymal brain imaging and CT or MR vascular imaging of the head and neck should be considered. Noncontrast head CT is often obtained first to assess for hemorrhage or large infarct. MRI is more sensitive than CT for acute infarct.	○
MRA head and neck without IV contrast	8	Can be obtained in conjunction with MRI head. Preferred MR vascular imaging of the head and neck includes noncontrast head MRA and contrast-enhanced neck MRA. May be useful in patients with renal failure or contrast allergies.	○
MRA head and neck without and with IV contrast	8	Can be obtained in conjunction with MRI head. Preferred MR vascular imaging of the head and neck includes noncontrast head MRA and contrast-enhanced neck MRA.	○
CT head without IV contrast	8	Noncontrast head CT is often obtained first to assess for hemorrhage or large infarct. MRI is more sensitive than CT for acute infarct.	☼☼☼
CTA head and neck with IV contrast	8	CTA can be obtained after NCCT.	☼☼☼
Arteriography cervicocerebral	6		☼☼☼
CT head perfusion with IV contrast	5		☼☼☼
MRI head perfusion with IV contrast	5		○
CT head with IV contrast	3		☼☼☼
CT head without and with IV contrast	3		☼☼☼
US duplex Doppler carotid	2		○

This imaging modality was ordered by the consulting neurologist when the patient presented for evaluation of the source of the stroke.

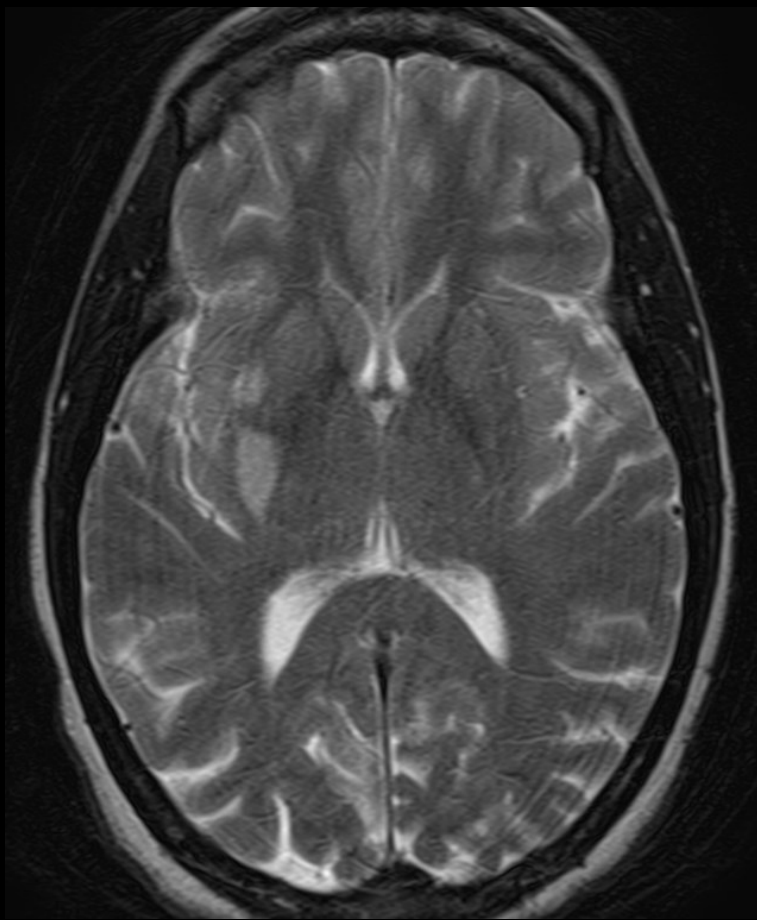
This imaging modality was ordered by the consulting neurologist when the patient presented for evaluation of the source of the stroke.

**Rating Scale:** 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate

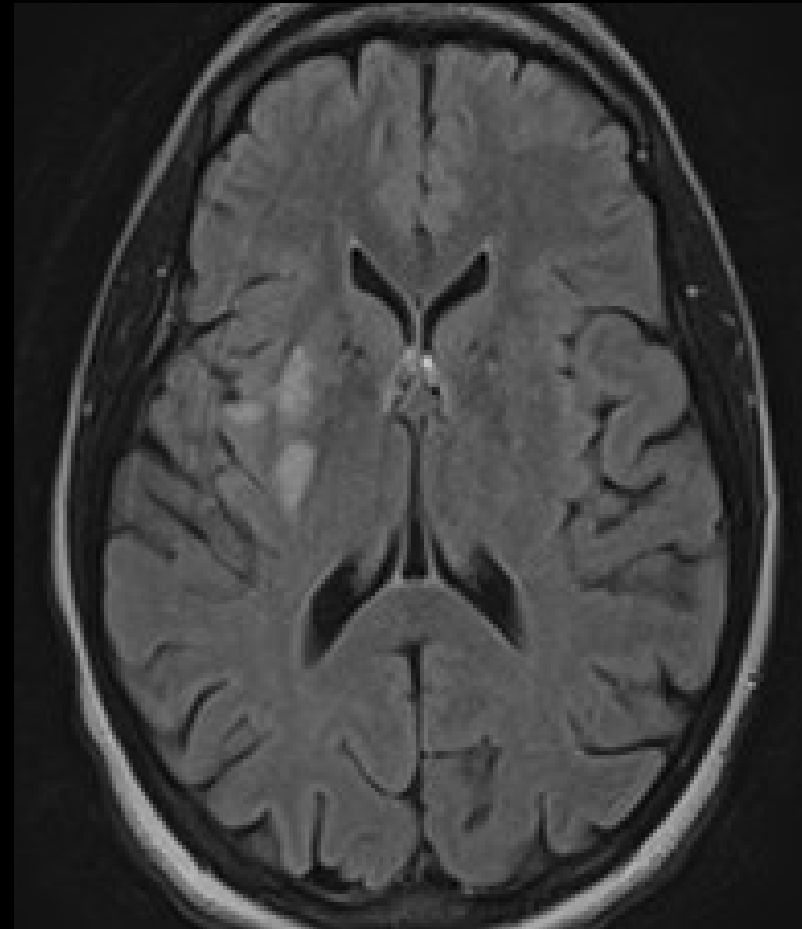
\*Relative Radiation Level



# MRI Findings (unlabeled)

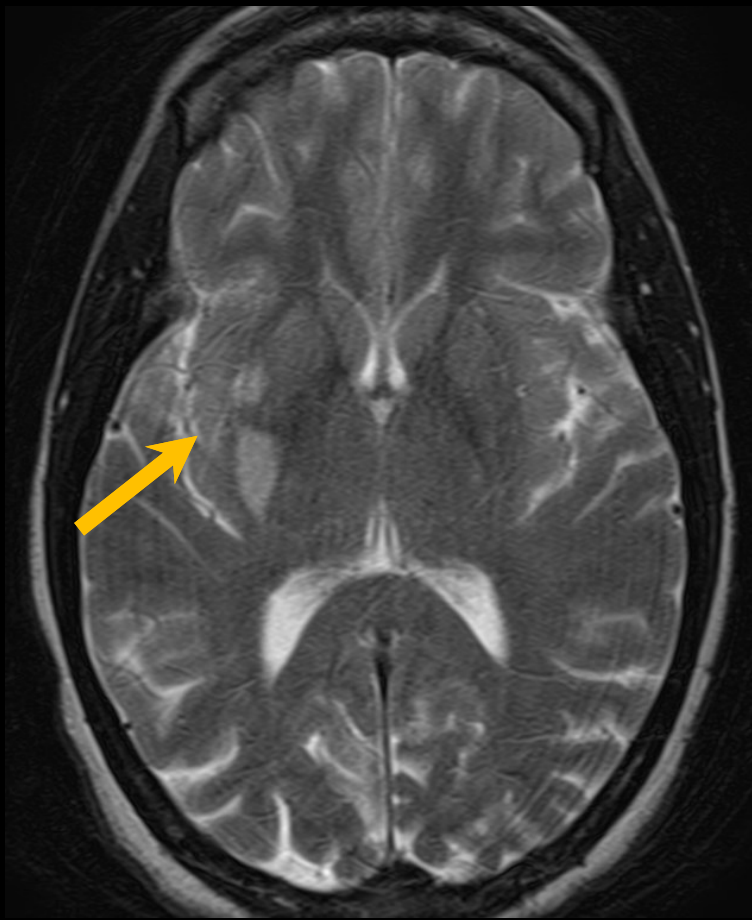


T2

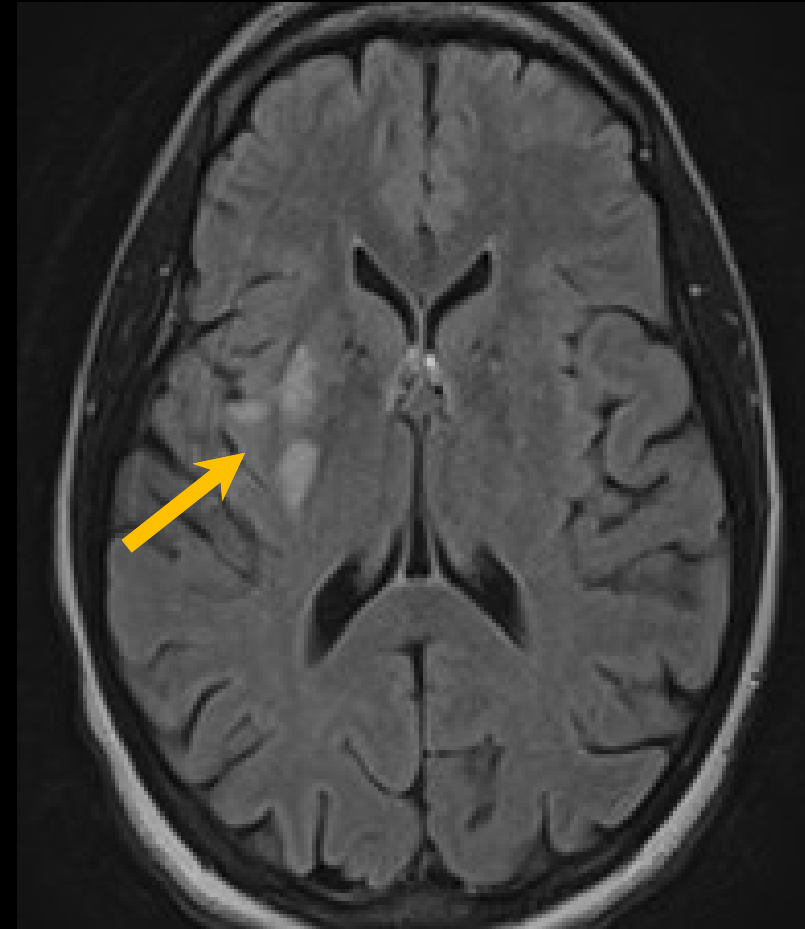


FLAIR

# MRI Findings (labeled)



T2

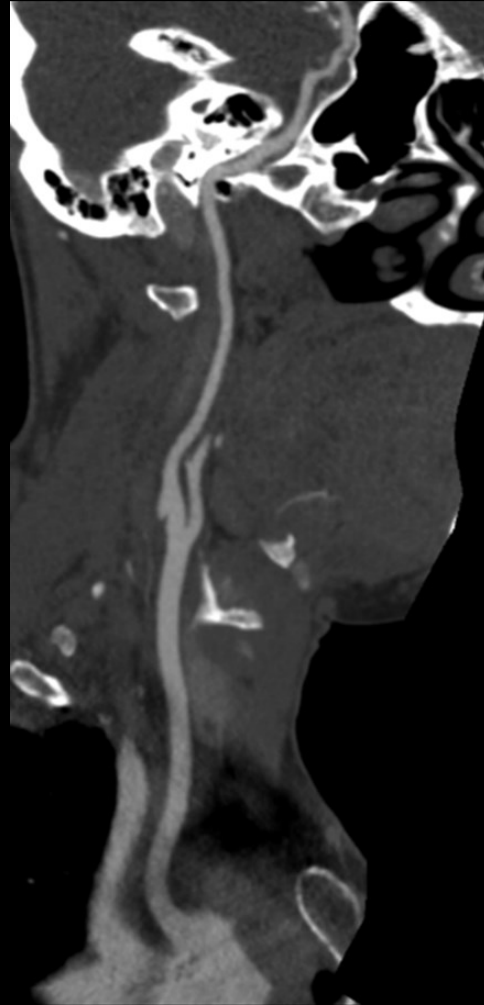


FLAIR

Confirmation of subacute infarction in the right basal ganglia extending into the external capsule.



# CTA Findings (unlabeled)

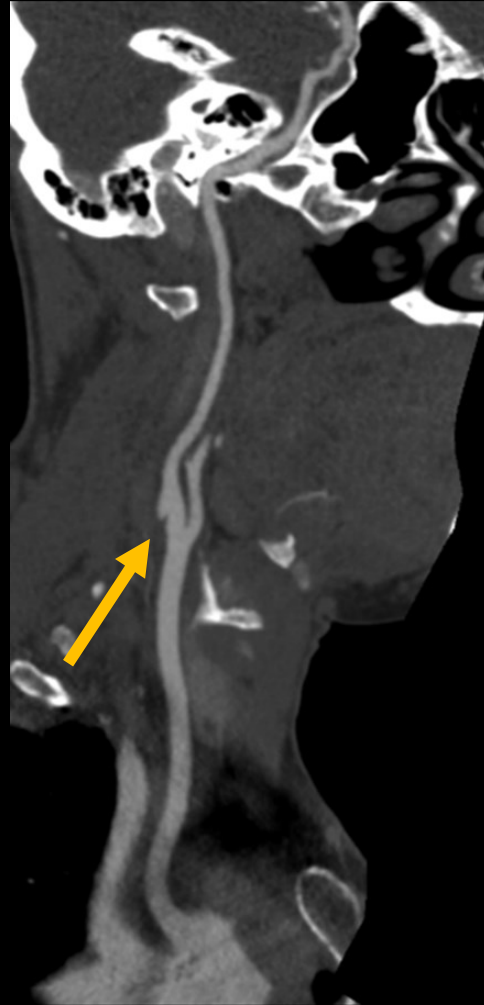


Left Carotid



Right Carotid

# CTA Findings (labeled)



Left Carotid

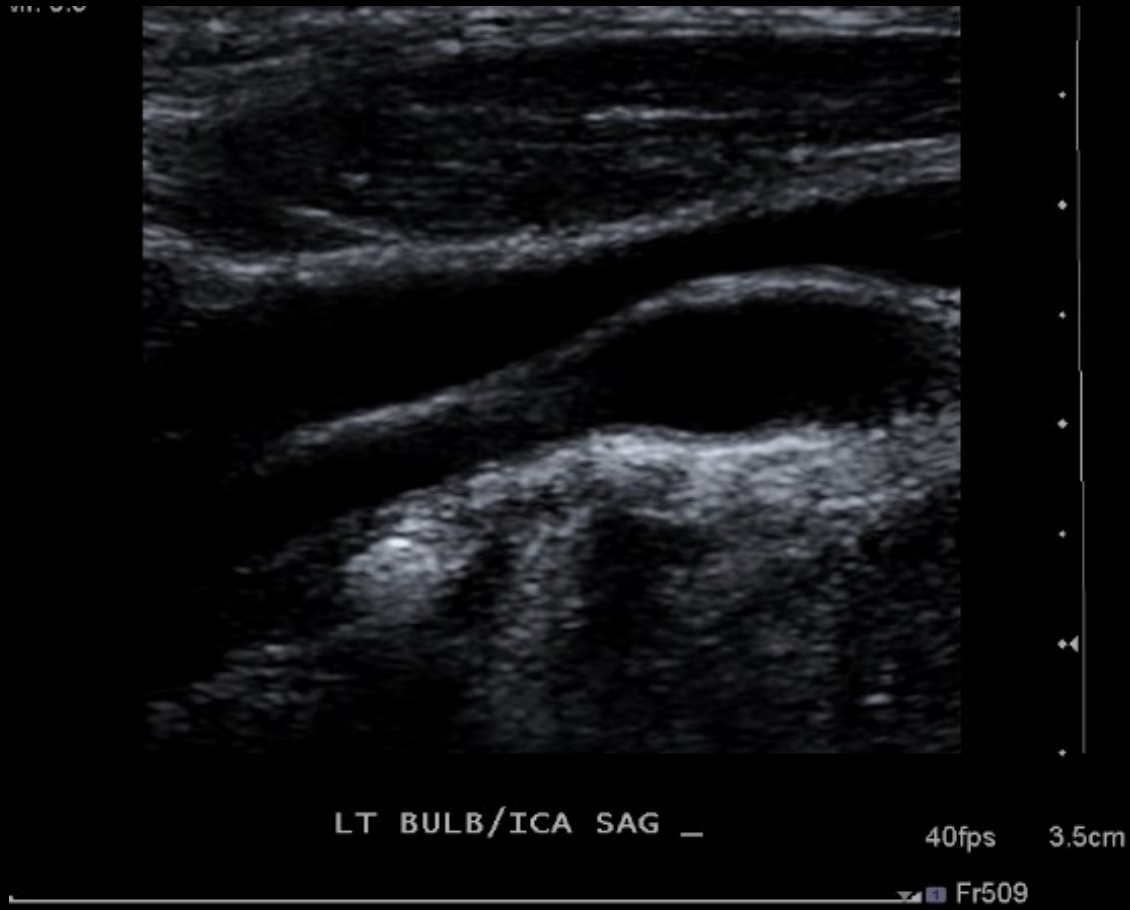


Right Carotid

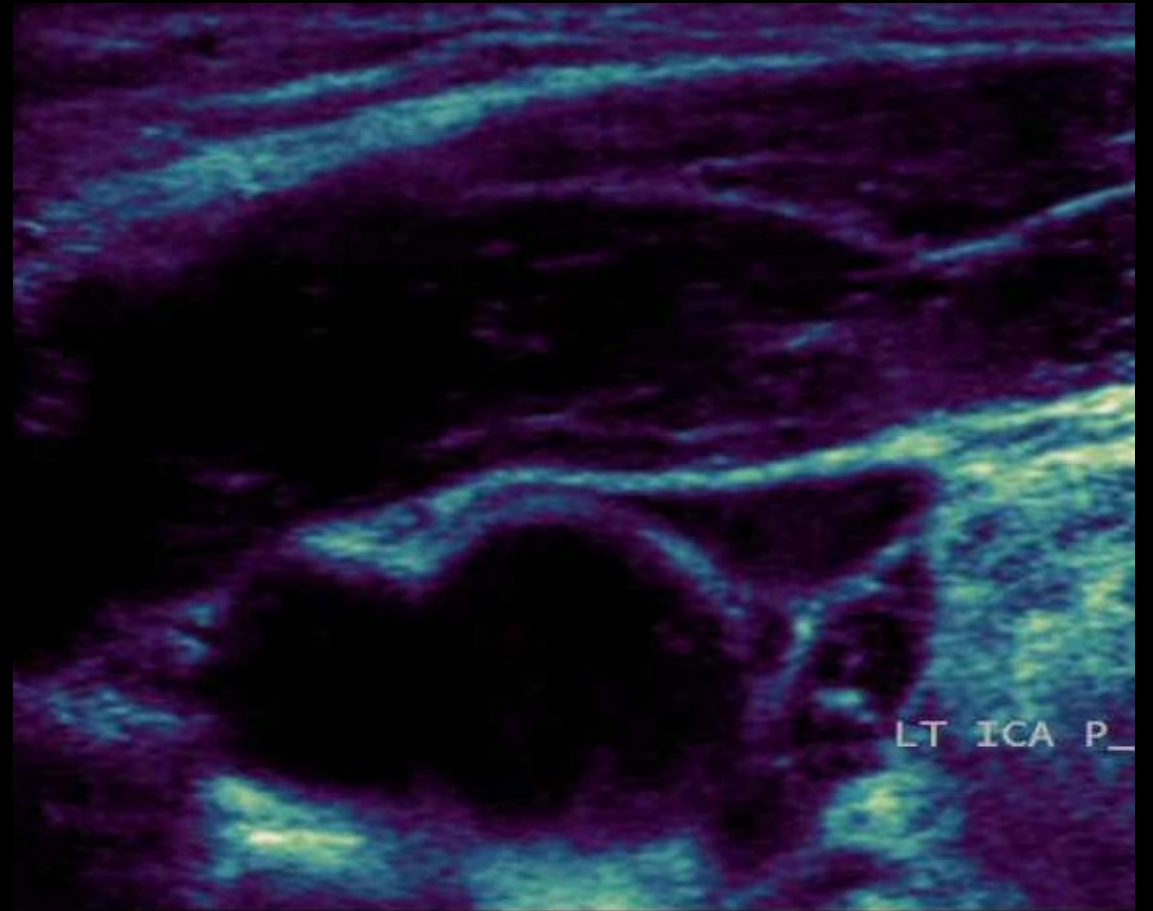
An incomplete shelf-like projection in the lumen of the carotid is visible on both the R and L sides, suggesting the presence of bilateral incomplete carotid webs.

Carotid US with Doppler was ordered for confirmation of character of filling defect

# Left Carotid US Findings (unlabeled)

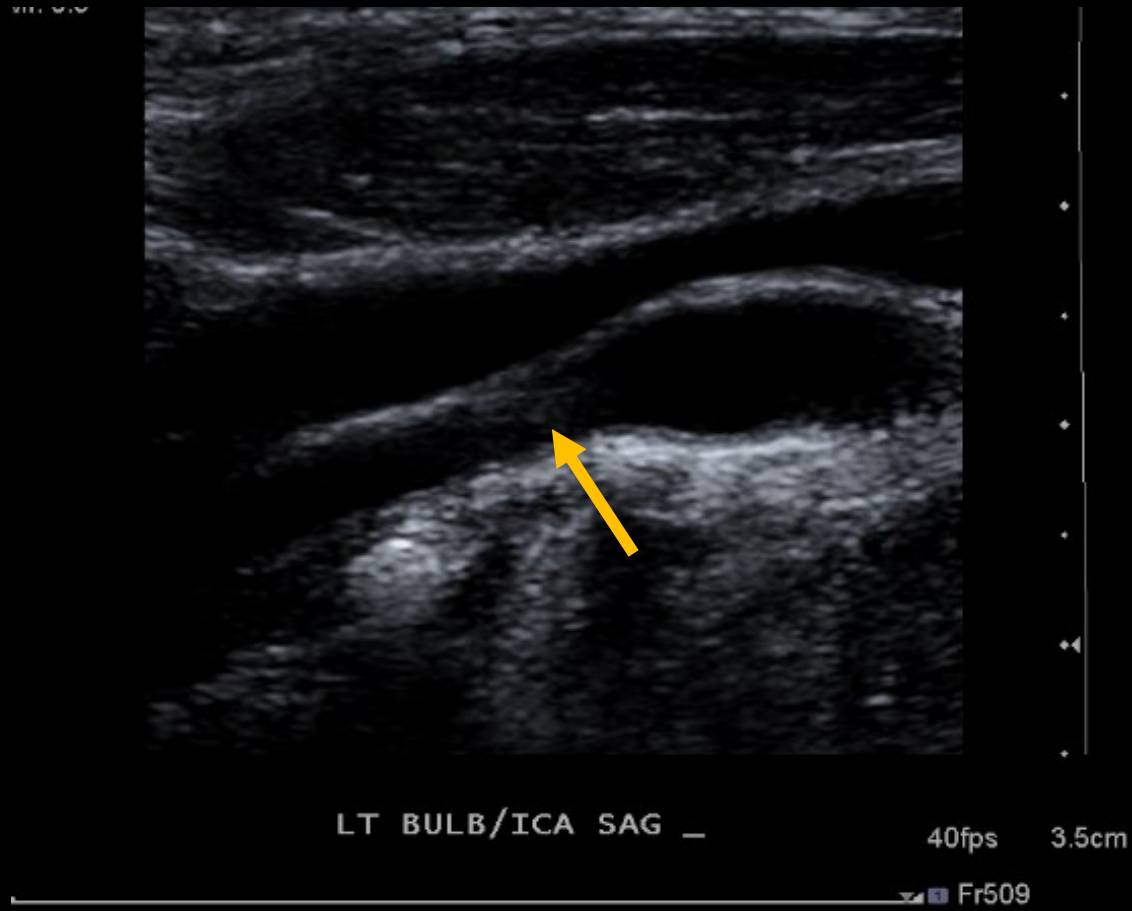


Longitudinal

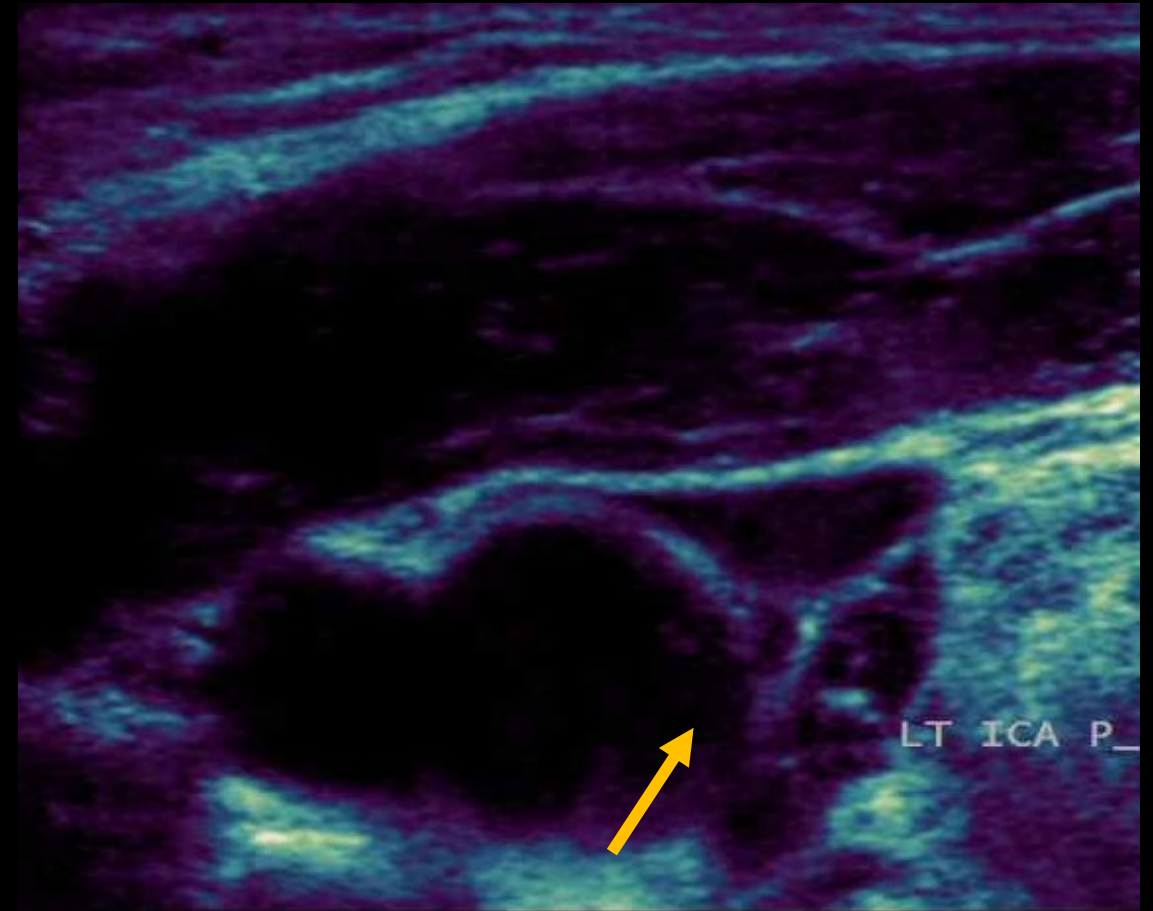


Transverse

# Left Carotid US Findings (labeled)



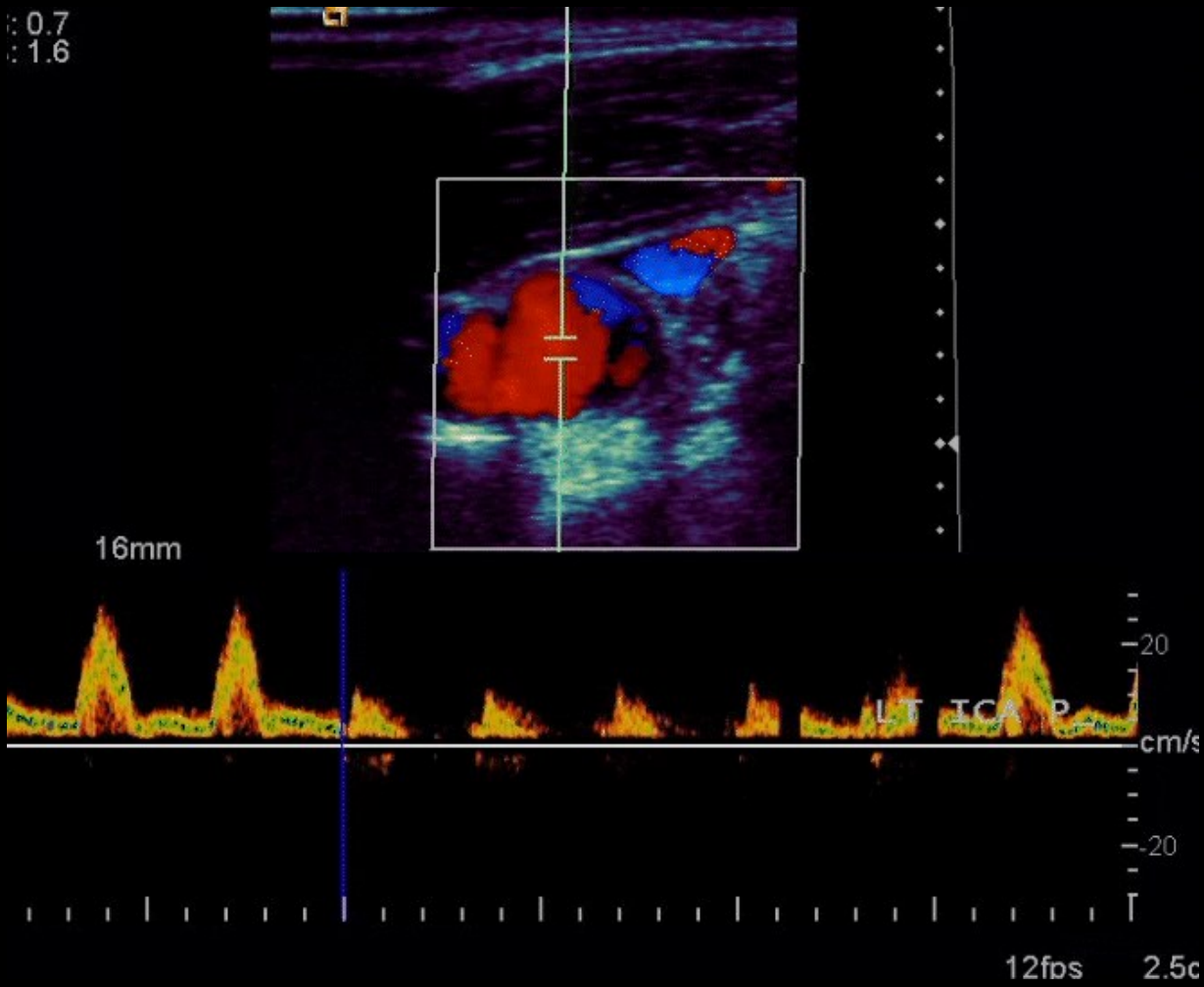
Longitudinal



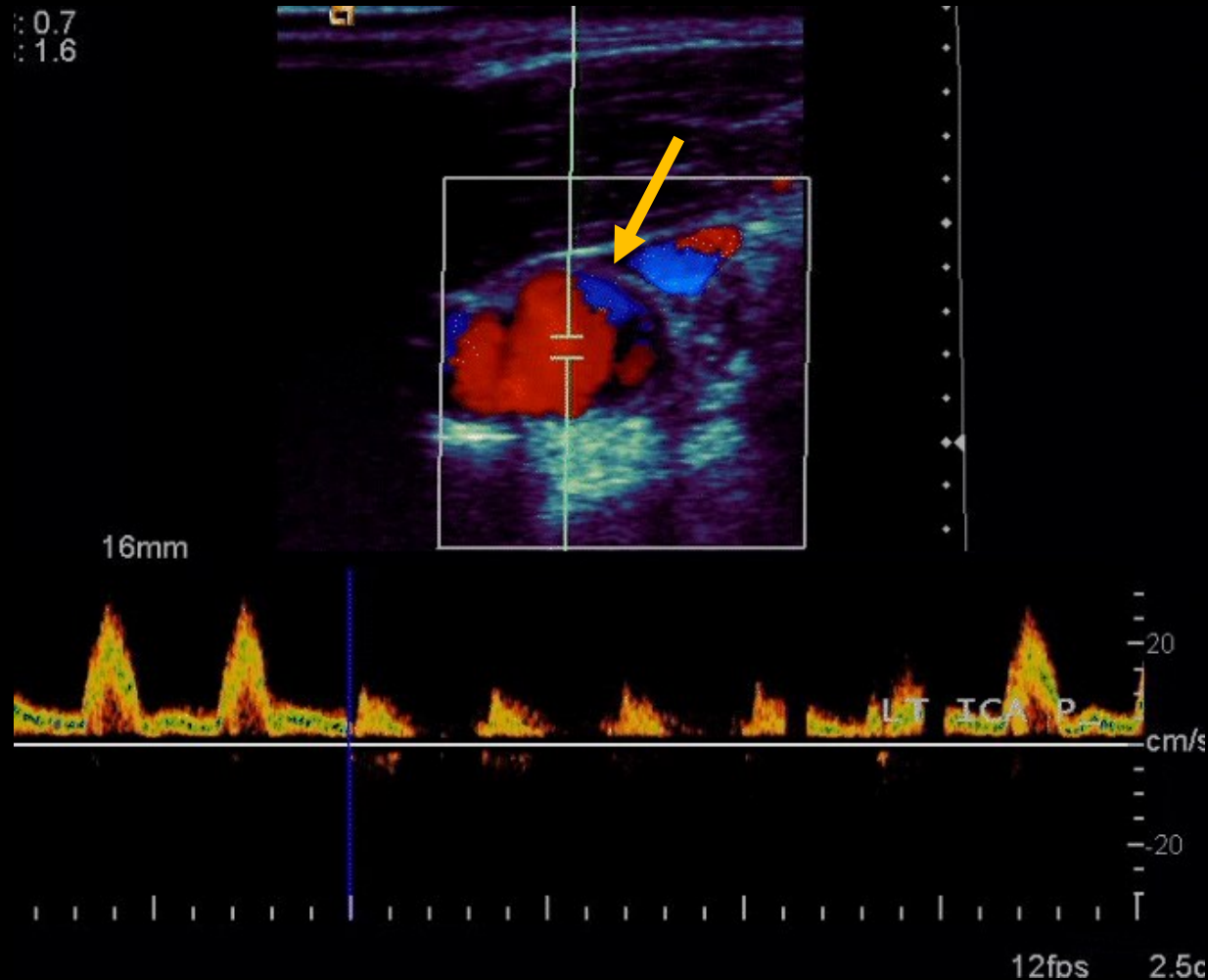
Transverse

A thin echogenic flap is present at the left carotid bifurcation.

# Left Carotid US with Doppler Findings (unlabeled)



# Left Carotid US with Doppler Findings (labeled)



Turbulent flow observed in the area of the false lumen created by the flap.

Final Dx:

Bilateral carotid webs



# Case Discussion

- Demographics - young patients, female and African American predominant (median age: 40.5y, IQR: 34-55y)<sup>1</sup>
- Definition - thought to be a rare variant of fibromuscular dysplasia<sup>2</sup>
  - Carotid webs are associated with a disturbed flow that might stimulate thrombus formation<sup>3</sup>
- Presentation - ischemic stroke<sup>1,4</sup> and pain in settings of trauma<sup>4</sup>
- Radiographic features - usually a linear filling defect at the posterior aspect of the carotid bulb<sup>4</sup>
  - 22% of patients identified in a systematic review had bilateral carotid webs<sup>5</sup>

# Case Discussion

- Carotid webs have a 2.3% prevalence in the United States<sup>6</sup>
  - Incidence of cryptogenic stroke associated with carotid web is 3.8 per 100,000 person years<sup>7</sup>
- Carotid webs are an important cause of cryptogenic stroke
  - Carotid webs seem to affect young, Black, and female patients in a higher proportion
  - Management:
    - Varied familiarity overall across subspecialties<sup>8</sup>
    - CTA was the preferred imaging modality<sup>8</sup>
    - Single (aspirin-only) or dual antiplatelet therapy were the most common management modalities<sup>8</sup>
    - Intervention (stent or endarterectomy) favored in recurrent strokes<sup>8</sup>

# Patient Outcome

- Patient placed on anticoagulation (rivaroxaban) and continued aspirin for stroke prophylaxis
- No need for statin for secondary stroke prevention, given underlying arteriopathy
  - Patient did not tolerate the previous trial of statin
- Plan for repeat CTA in 1 year

# References:

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6. Mei J, Chen D, Esenwa C, et al. Carotid web prevalence in a large hospital-based cohort and its association with ischemic stroke. *Clin Anat.* 2021;34(6):867-871. doi:10.1002/ca.23735
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