AMSER Case of the Month July 2026

An Incidental Twist in Stroke Evaluation

72 y.o. man presenting for sudden LEFT UE weakness

UT VITAM HABEANT ABUNDANTIUS HABEANT
AMERICAN UNIVERSITY OF BEIRUT
FACULTY OF MEDICINE

Ryan Dib Nehme, MS4

Cleveland Clinic

David Taft, MD
Marijo Wohlfert, MD
Deborah Brahee, MD

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Patient Presentation

. Patient: 72-year-old male

. Past Medical History:

    . Hypertension (HTN)

    . Type 2 Diabetes Mellitus (T2DM)

    . Hyperlipidemia (HL)

. Chief Complaint:

Sudden onset of left upper extremity weakness, associated with dysarthria (slurred speech)

. Last Known Well: 09:00 AM

. Neurologic Assessment: NIH Stroke Scale score: 8 (moderate)

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NIH Stroke Score (1)

Stroke severity score

. LOC

. Eye movements, visual fields

. Facial palsy

. Motor strength/sensory loss

. Language, speech, etc.

Score	Severity
0	No stroke Sx
1-4	Minor stroke
5-15	Moderate
16-25	M to Severe
26-42	Severe

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What imaging should we order?

Select the applicable ACR Appropriateness Criteria

Variant: 2 **Adult. Focal neurologic deficit. Clinically suspected acute ischemic stroke. Initial imaging.**

Procedure	Appropriateness Category	Relative Radiation Level
MRI head without IV contrast	Usually Appropriate	O
CT head without IV contrast	Usually Appropriate	☢☢☢
CTA head with IV contrast	Usually Appropriate	☢☢☢
CTA neck with IV contrast	Usually Appropriate	☢☢☢
US duplex Doppler carotid artery	May Be Appropriate	O
MRA head without IV contrast	May Be Appropriate	O
MRA neck without and with IV contrast	May Be Appropriate	O
MRA neck without IV contrast	May Be Appropriate	O
MRI head perfusion with IV contrast	May Be Appropriate	O
CT head perfusion with IV contrast	May Be Appropriate	☢☢☢
US duplex Doppler transcranial	Usually Not Appropriate	O
Arteriography cervicocerebral	Usually Not Appropriate	☢☢☢
MRA head without and with IV contrast	Usually Not Appropriate	O
MRI head without and with IV contrast	Usually Not Appropriate	O
MRV head without and with IV contrast	Usually Not Appropriate	O
MRV head without IV contrast	Usually Not Appropriate	O
CT head with IV contrast	Usually Not Appropriate	☢☢☢
CT head without and with IV contrast	Usually Not Appropriate	☢☢☢
CTV head with IV contrast	Usually Not Appropriate	☢☢☢

This imaging modality was ordered by the ER physician

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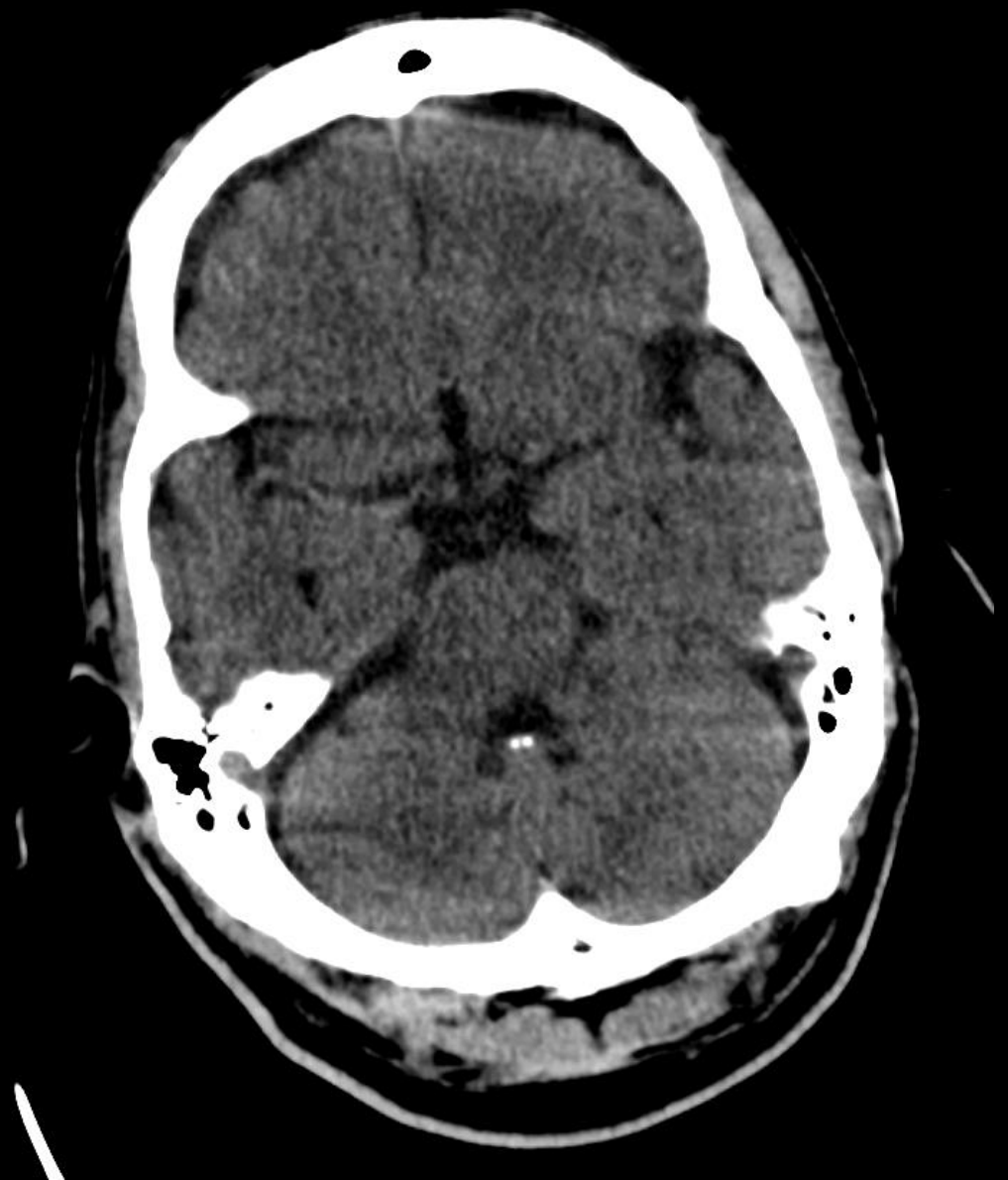
Findings (unlabeled)



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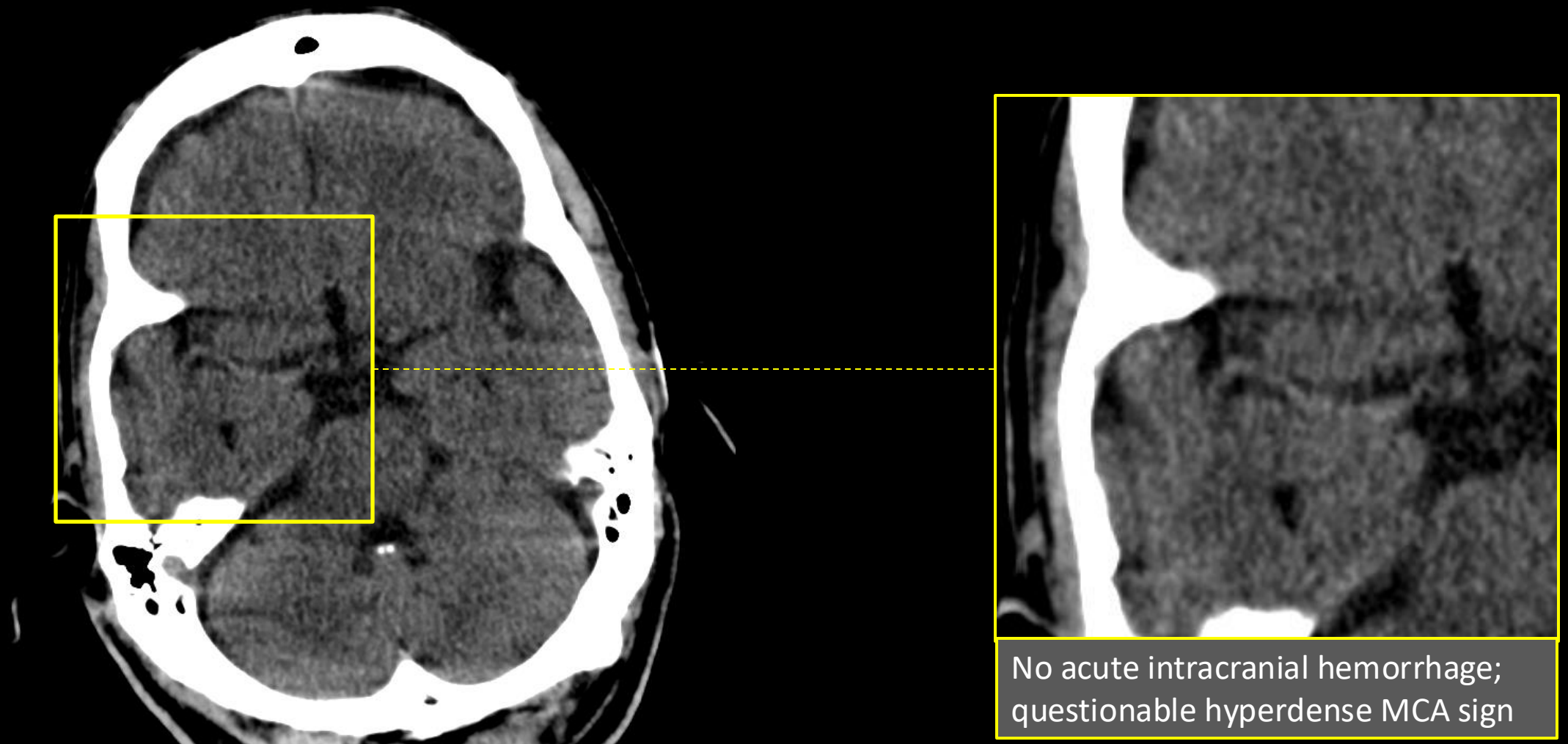

No acute intracranial hemorrhage; questionable hyperdense MCA sign

Case Continued

. Patient: 72-year-old male
. Past Medical History: HTN, T2DM, HL
. CC: Sudden onset of LEFT UE weakness w/ dysarthria
. LKW: 09:00 AM
. Neurologic Assessment: NIHSS: 8 (moderate)
. CT Head without contrast: "No acute intracranial hemorrhage"; patient was given Tenecteplase as hemorrhagic stroke was ruled out and time elapsed since presentation was t < 4.5 hours

After non-contrast CT excluded intracranial hemorrhage, what imaging study to order?

Select the applicable ACR Appropriateness Criteria

Variant: 2 **Adult. Focal neurologic deficit. Clinically suspected acute ischemic stroke. Initial imaging.**

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MRI head without IV contrast	Usually Appropriate	O
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CTA head with IV contrast	Usually Appropriate	☢☢☢
CTA neck with IV contrast	Usually Appropriate	☢☢☢
US duplex Doppler carotid artery	May Be Appropriate	O
MRA head without IV contrast	May Be Appropriate	O
MRA neck without and with IV contrast	May Be Appropriate	O
MRA neck without IV contrast	May Be Appropriate	O
MRI head perfusion with IV contrast	May Be Appropriate	O
CT head perfusion with IV contrast	May Be Appropriate	☢☢☢
US duplex Doppler transcranial	Usually Not Appropriate	O
Arteriography cervicocerebral	Usually Not Appropriate	☢☢☢
MRA head without and with IV contrast	Usually Not Appropriate	O
MRI head without and with IV contrast	Usually Not Appropriate	O
MRV head without and with IV contrast	Usually Not Appropriate	O
MRV head without IV contrast	Usually Not Appropriate	O
CT head with IV contrast	Usually Not Appropriate	☢☢☢
CT head without and with IV contrast	Usually Not Appropriate	☢☢☢
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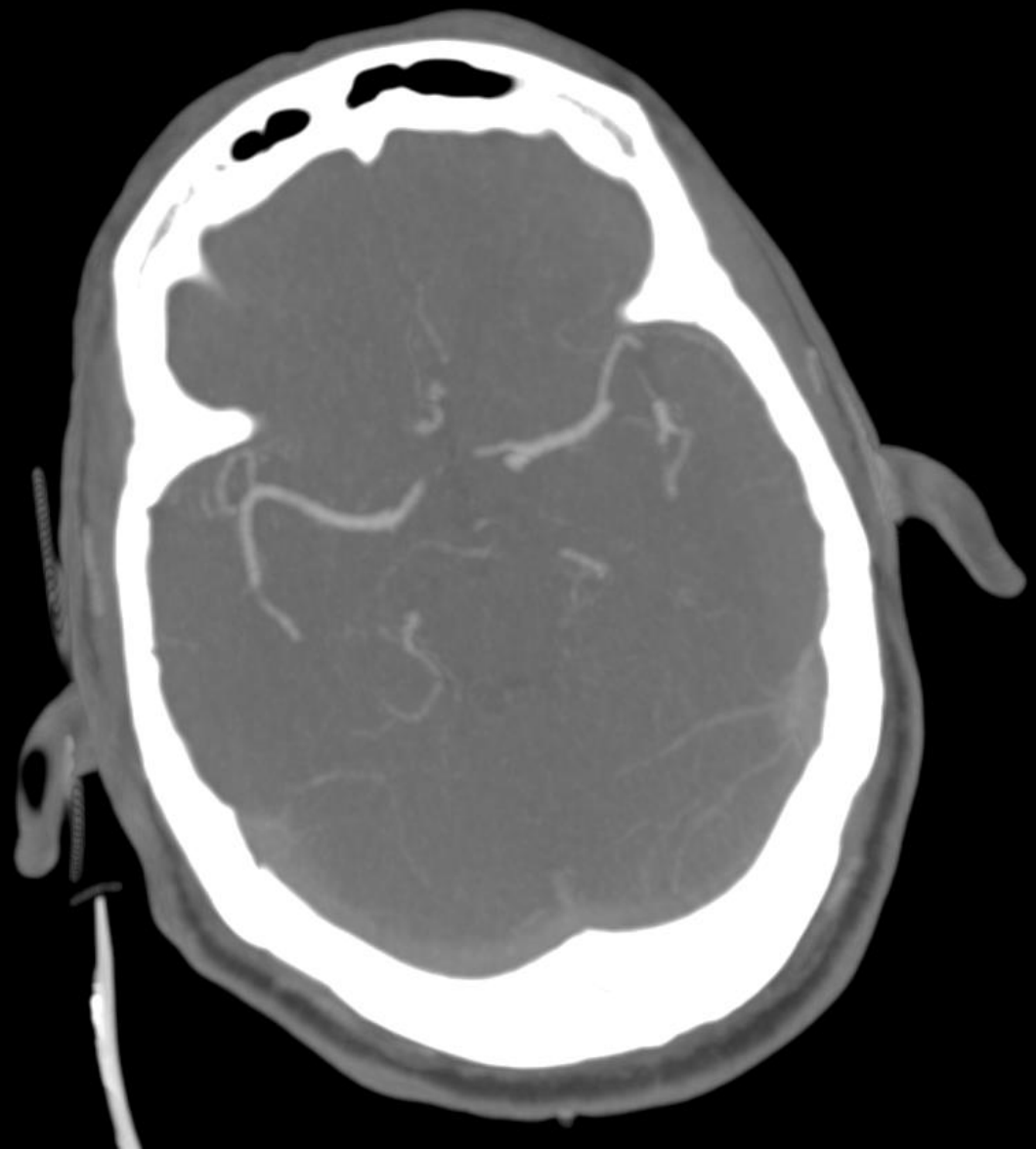

Findings (labeled)

(↗) No large vessel occlusion (LVO) or high-grade stenosis of the MCA

CT Angiography Head AND Neck

Head **AND** Neck

. **20-30%** of large vessel strokes caused by emboli from carotid or vertebral arteries (2)

. treatment varies accordingly
. prevent recurrent stroke

Rule in/out LVO

Directly images blood vessels
. filling defects, collaterals
. vascular tree mapping

. sensitivity: 95-99%
. specificity: 90-98%

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Case Continued

. Patient: 72-year-old male, known to have HTN, T2DM, HL

. CC: Sudden LEFT UE weakness w/ dysarthria; LKW: 09:00 AM

. Neurologic Assessment: NIHSS: 8 (moderate)

. CT Head without contrast: “No acute intracranial hemorrhage”; Tenecteplase given as no hemorrhagic stroke and t < 4.5 hours

. CTA Head and Neck: “No large vessel occlusion or high-grade stenosis”; patient is not candidate for endovascular intervention; he was managed by keeping BP < 180/105, NO antiplatelets or anticoagulants for 24h, and started on Atorvastatin

What imaging should we order?

Select the applicable ACR Appropriateness Criteria

Variant: 2 Adult. Focal neurologic deficit. Clinically suspected acute ischemic stroke. Initial imaging.

Procedure	Appropriateness Category	Relative Radiation Level
MRI head without IV contrast	Usually Appropriate	O
CT head without IV contrast	Usually Appropriate	☢☢☢
CTA head with IV contrast	Usually Appropriate	☢☢☢
CTA neck with IV contrast	Usually Appropriate	☢☢☢
US duplex Doppler carotid artery	May Be Appropriate	O
MRA head without IV contrast	May Be Appropriate	O
MRA neck without and with IV contrast	May Be Appropriate	O
MRA neck without IV contrast	May Be Appropriate	O
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CT head perfusion with IV contrast	May Be Appropriate	☢☢☢
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MRA head without and with IV contrast	Usually Not Appropriate	O
MRI head without and with IV contrast	Usually Not Appropriate	O
MRV head without and with IV contrast	Usually Not Appropriate	O
MRV head without IV contrast	Usually Not Appropriate	O
CT head with IV contrast	Usually Not Appropriate	☢☢☢
CT head without and with IV contrast	Usually Not Appropriate	☢☢☢
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This imaging modality was ordered by the primary team

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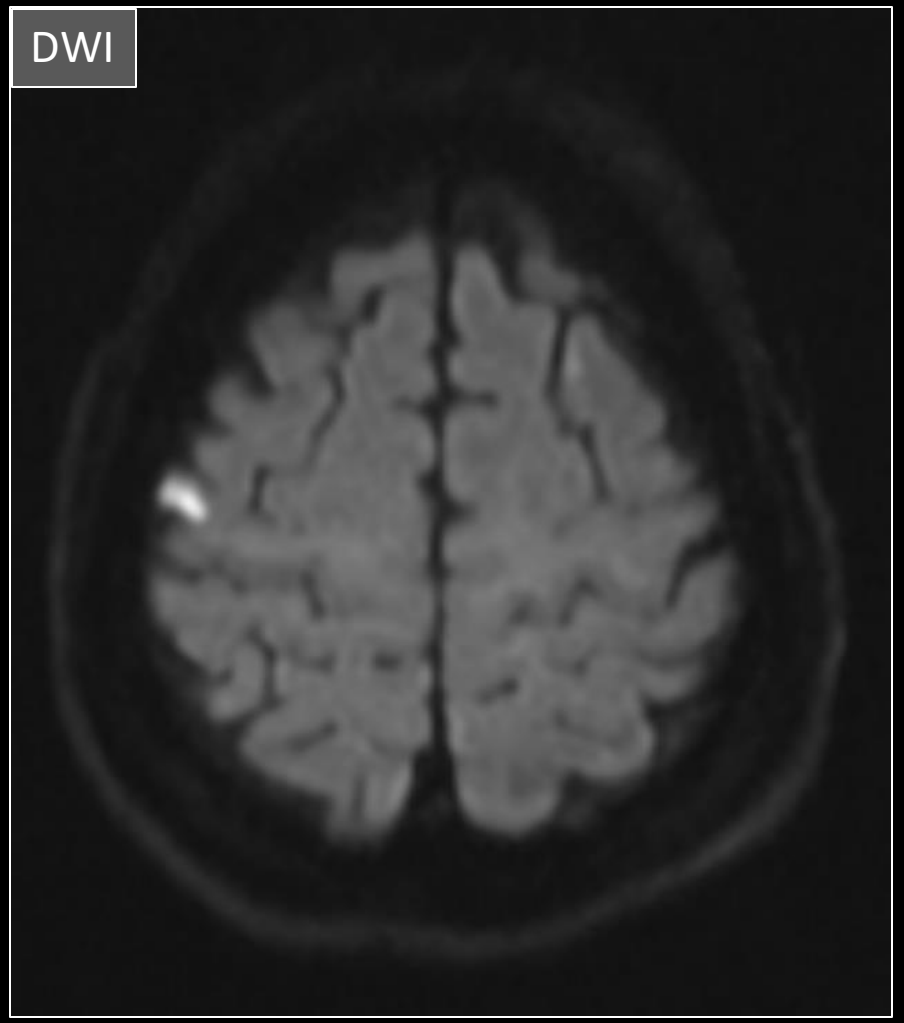

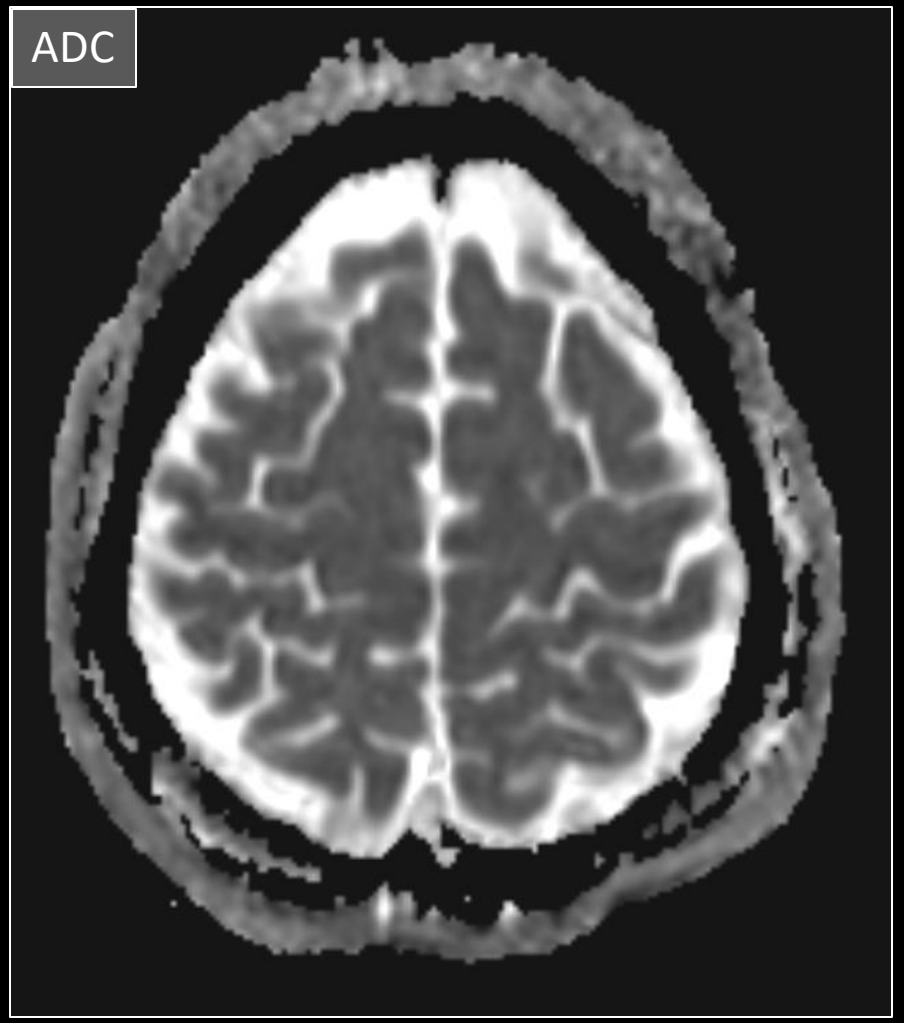

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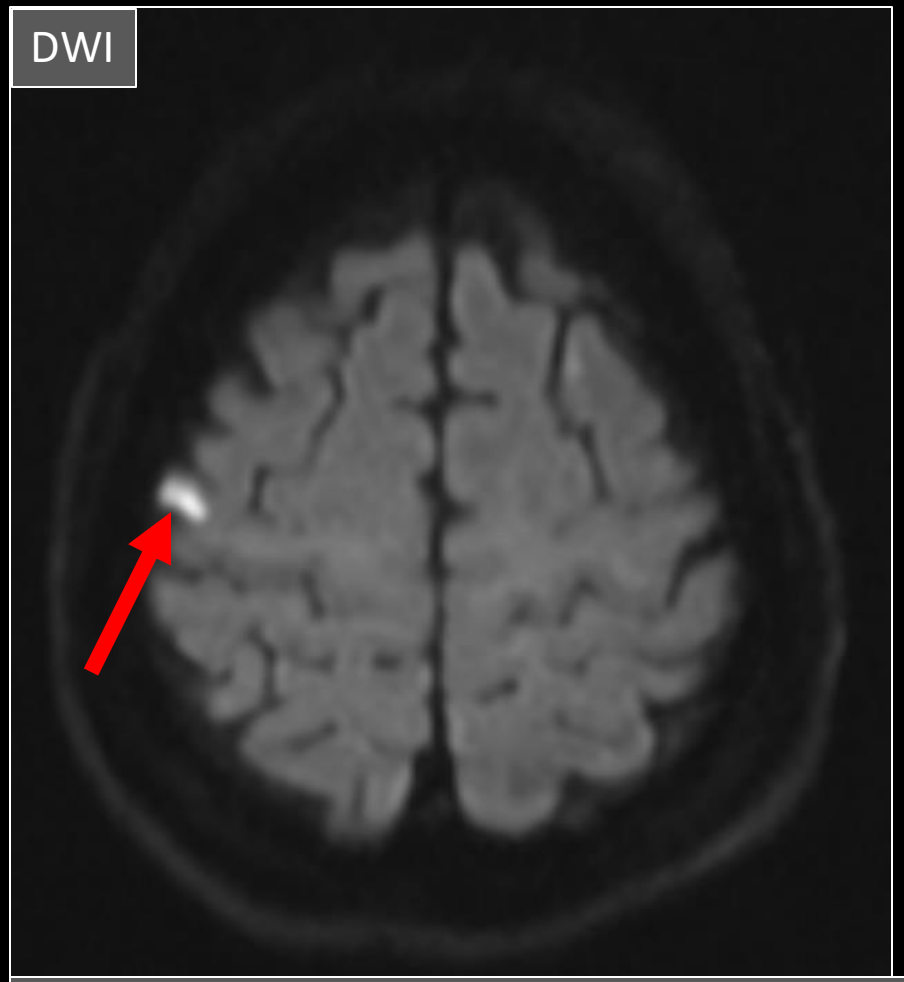

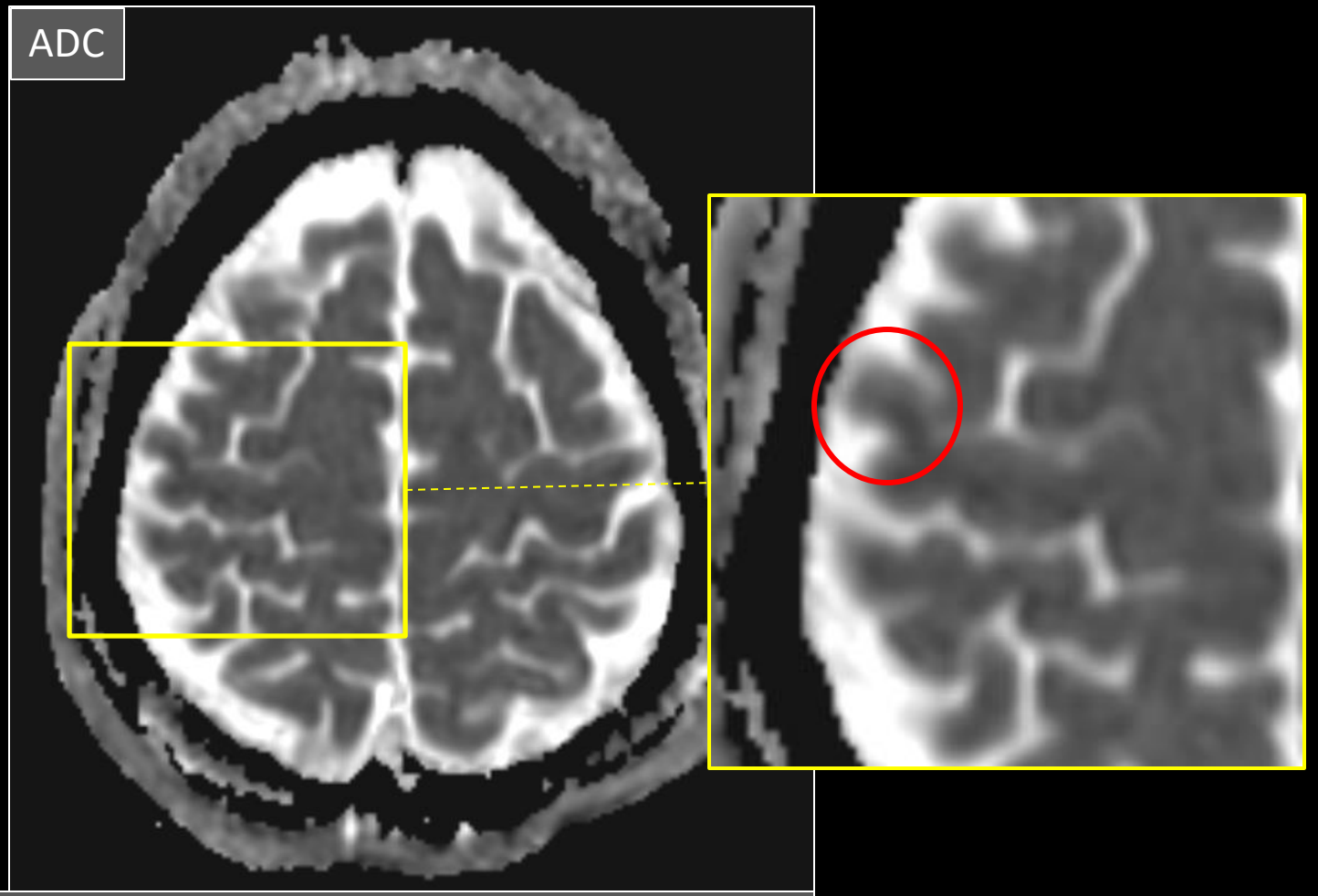

. Focal hyperintensity on DWI (↗) and corresponding hypointensity on ADC (O)
. Findings demonstrate true restricted diffusion consistent with acute infarction

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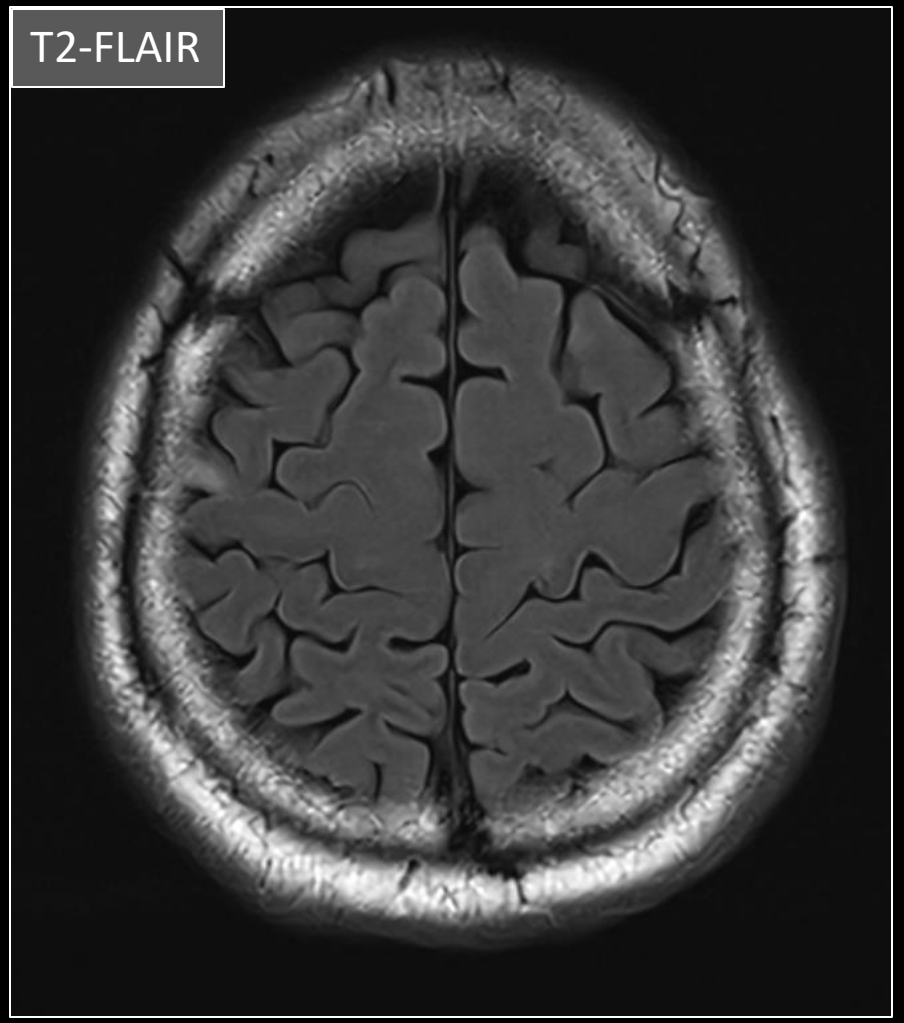
Findings (unlabeled)



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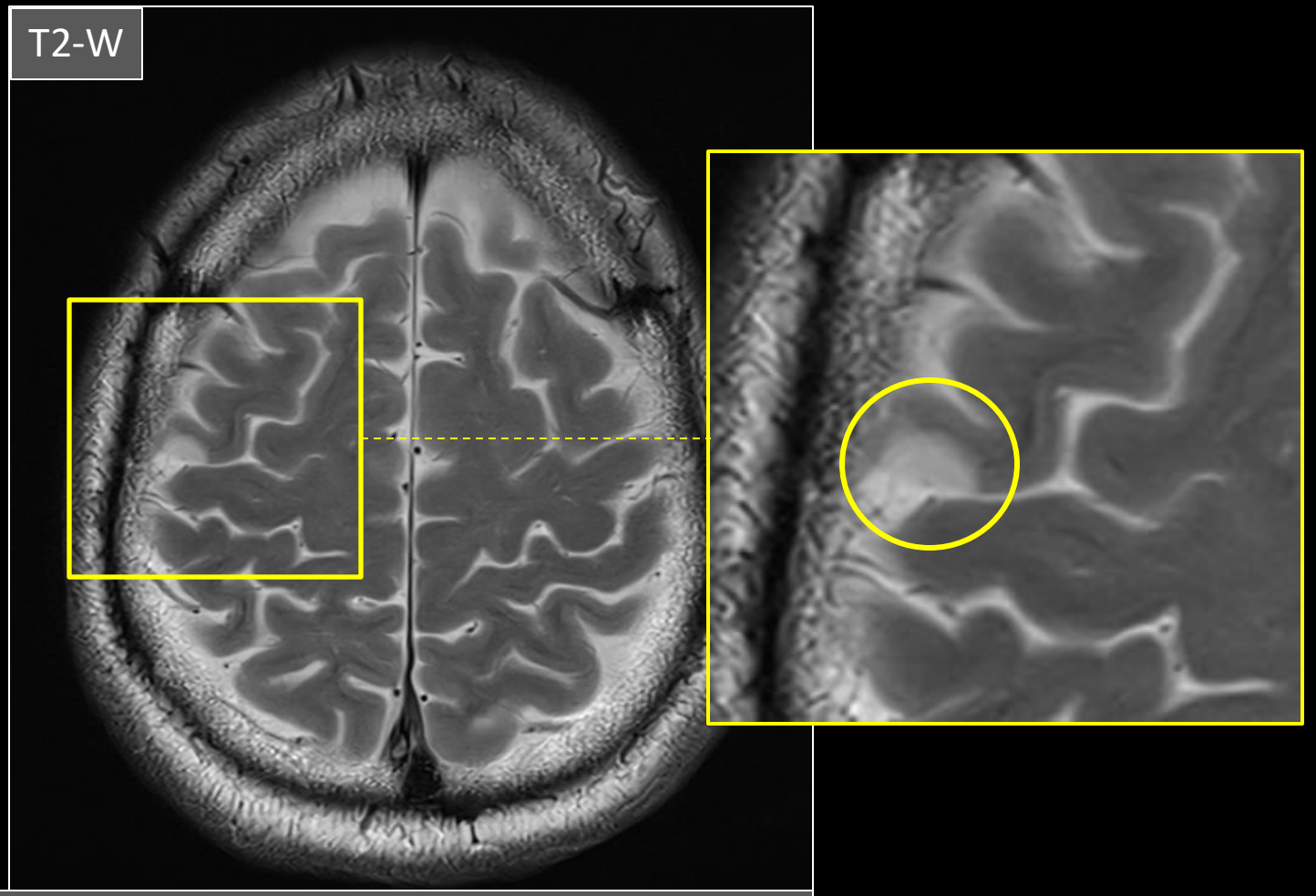

. Cortical T2-FLAIR hyperintensity (O) and corresponding T2-W hyperintensity (O)
. Associated T2/FLAIR hyperintensity indicates developing cytotoxic edema

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Case Continued

. CC: Sudden onset of LEFT UE weakness w/ dysarthria

. CTA Head and Neck: “No large vessel occlusion or high-grade stenosis”; patient is not candidate for endovascular intervention; keep BP < 180/105, Tenecteplase given, NO antiplatelets or anticoagulants for 24h, and started on Atorvastatin

. MR Brain: “Small acute cortical infarcts in the right frontal lobe, with diffusion restriction and associated T2/FLAIR hyperintensity, including dominant focus in the lateral aspect of the right precentral gyrus and adjacent frontal lobe”

What imaging should we order 24 hours after the patient ischemic stroke was established?

Select the applicable ACR Appropriateness Criteria

Variant: 5 Adult. Prior ischemic infarct. Surveillance imaging.

Procedure	Appropriateness Category	Relative Radiation Level
CT head without IV contrast	Usually Appropriate	☢☢☢
US duplex Doppler carotid artery	May Be Appropriate	O
MRA head without IV contrast	May Be Appropriate (Disagreement)	O
MRA neck without and with IV contrast	May Be Appropriate (Disagreement)	O
MRA neck without IV contrast	May Be Appropriate	O
MRI head without IV contrast	May Be Appropriate (Disagreement)	O
CTA head with IV contrast	May Be Appropriate	☢☢☢
CTA neck with IV contrast	May Be Appropriate	☢☢☢
US duplex Doppler transcranial	Usually Not Appropriate	O
Arteriography cervicocerebral	Usually Not Appropriate	☢☢☢
MRA head without and with IV contrast	Usually Not Appropriate	O
MRI head perfusion with IV contrast	Usually Not Appropriate	O
MRI head without and with IV contrast	Usually Not Appropriate	O
MRV head without and with IV contrast	Usually Not Appropriate	O
MRV head without IV contrast	Usually Not Appropriate	O
CT head perfusion with IV contrast	Usually Not Appropriate	☢☢☢
CT head with IV contrast	Usually Not Appropriate	☢☢☢
CT head without and with IV contrast	Usually Not Appropriate	☢☢☢
CTV head with IV contrast	Usually Not Appropriate	☢☢☢

This imaging modality was ordered by the primary team

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Case Continued

. CTA Head and Neck: “No large vessel occlusion […]”

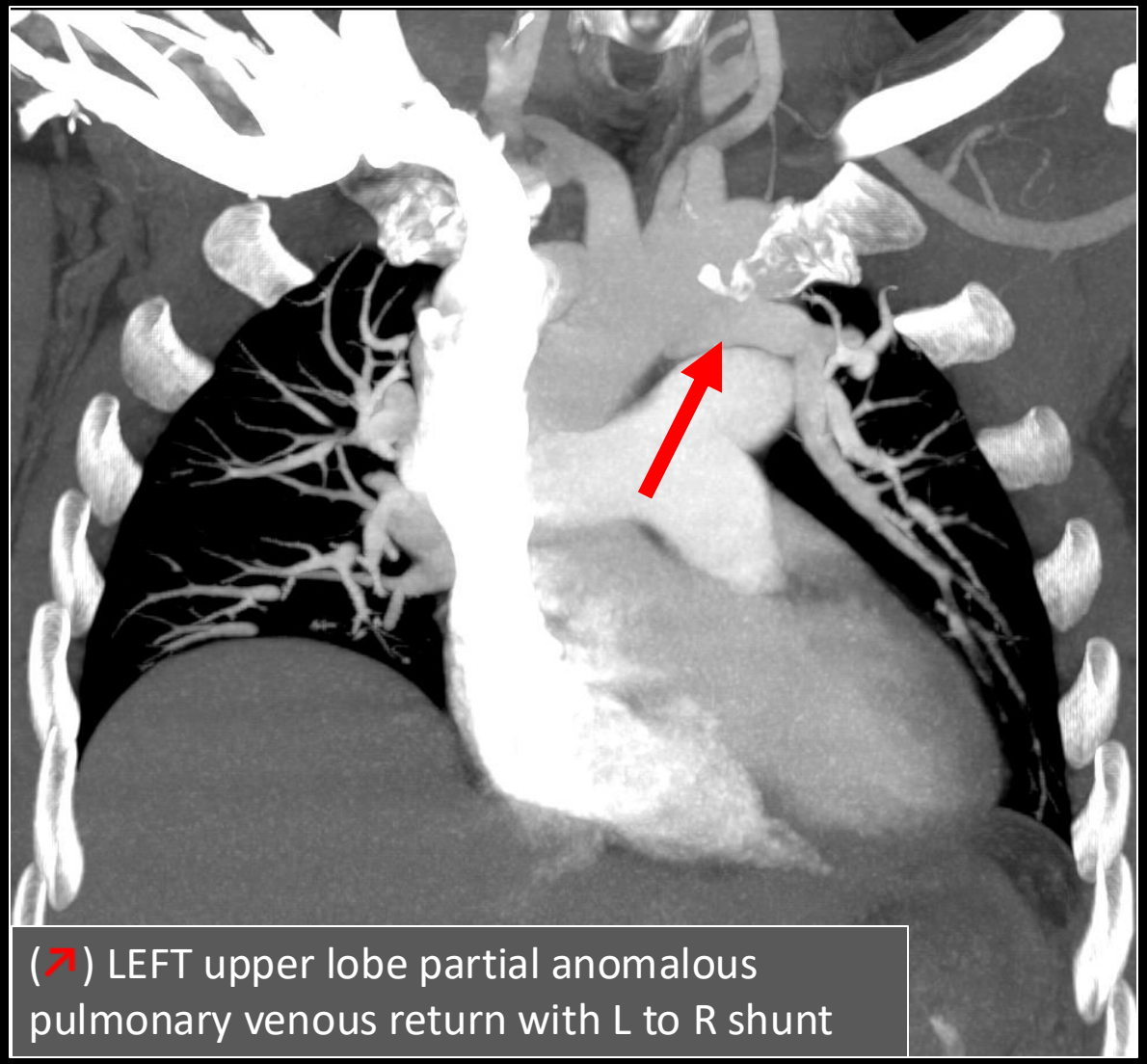
. MR Brain: “Small acute cortical infarcts in R frontal lobe […]”

. CT Head without contrast: ordered to evaluate for hemorrhagic conversion; imaging showed “No Bleed”; primary team concluded “etiology likely due to cardioembolic vs small vessel disease” and ordered echocardiography with agitated saline after lower extremities venous duplex was “Negative for acute DVT”

. Echocardiography: “Evidence of R to L shunt may have contributed to embolic stroke; please review patient prior CT chest imaging done in 2016”

Findings (unlabeled)

Findings (labeled)



(↗) LEFT upper lobe partial anomalous pulmonary venous return with L to R shunt

Partial Anomalous Pulmonary Venous Return (PAPVR)

Some pulmonary veins drain into R heart or systemic venous system

Epidemiology

. prevalence of 0.4-0.7% (3)

Presentation

. dyspnea, palpitation, chest pain if shunt large enough

Classification

. mixed/supra/infra/cardiac (3)

Associations

. 40% of PAPVR patients present with Atrial Septal Defect (4)

. Scimitar syndrome: PAPVR with hypoplastic lung (5)

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Case Continued

. Echocardiography: “Evidence of R to L shunt may have contributed to embolic stroke; please review patient prior CT chest imaging done in 2016”

. Chest CT done in 2016: “LEFT upper lobe partial anomalous pulmonary venous return with L to R shunt” is a confusing finding as the echocardiography highlighted a R to L shunt; the cardioembolic origin of the stroke may be due to an atrial septal defect [L to R shunt] as PAPVR is associated with the latter condition; patient is currently scheduled for a Trans Esophageal Echocardiography (TEE) examination

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References

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