AMSER Case of the Month October 2022

25-year-old male presenting with nausea and vomiting after a seizure-like episode

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Patient Presentation

- HPI: 25-year-old male presents to the ED following seizure-like activity, nausea, and vomiting.
- Medical and Surgical Hx: Non-contributory
- Family Hx: Migraines (mother). No family hx of seizures.
- Social Hx: Daily marijuana use, social alcohol use.
- Physical Exam: Mild suprapubic tenderness, otherwise normal
- Physical Exam:: CBC, BMP, and urinalysis ordered.
  - Mild proteinuria and microhematuria.
  - All other lab findings normal.

What Imaging Should We Order?

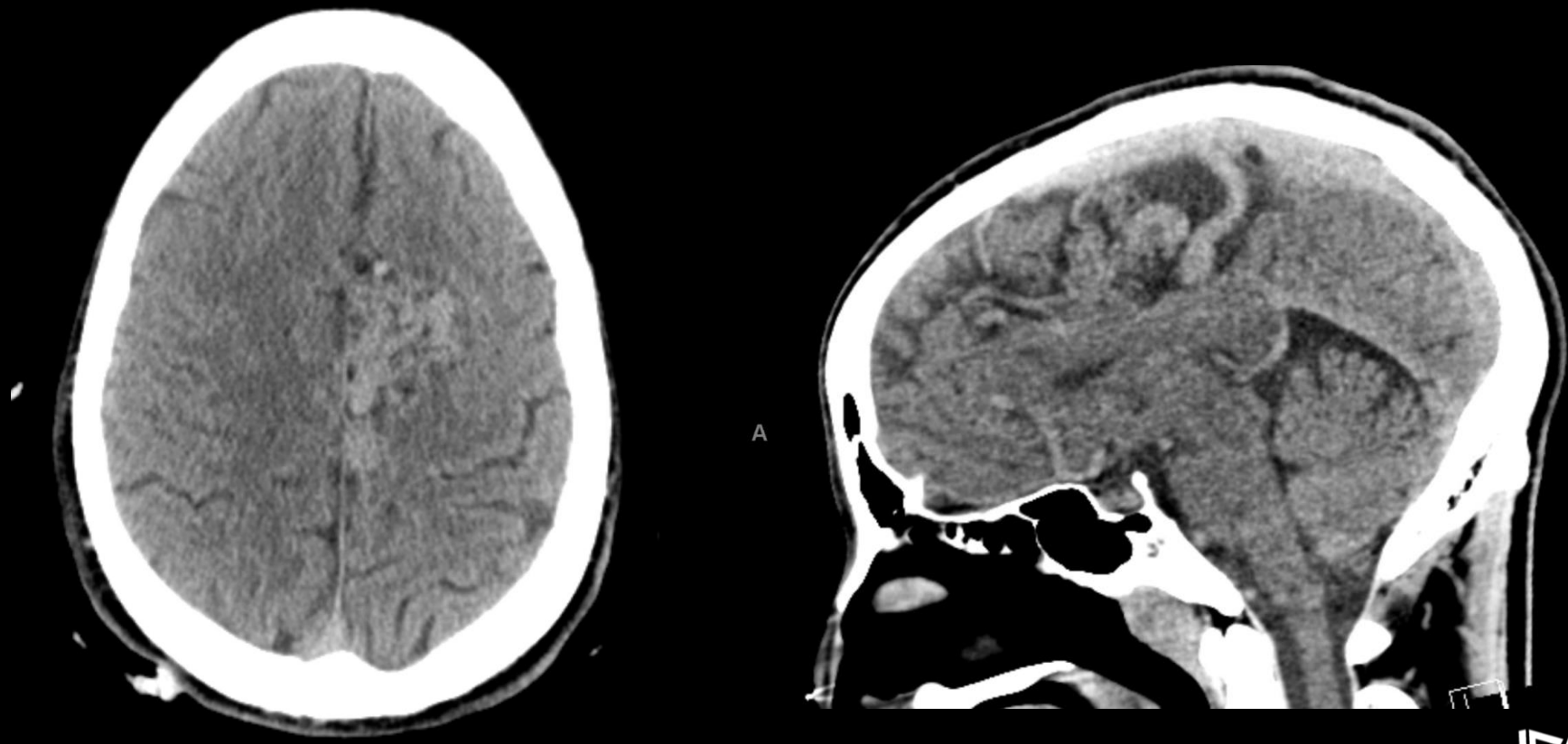
Select the applicable ACR Appropriateness Criteria

Variant 1: **New-onset seizure. Unrelated to trauma. Initial imaging.**

Procedure	Appropriateness Category	Relative Radiation Level
CT head without IV contrast	Usually Appropriate	☢☢☢
MRI head without IV contrast	Usually Appropriate	O
MRI head without and with IV contrast	May Be Appropriate	O
CT head with IV contrast	Usually Not Appropriate	☢☢☢
CT head without and with IV contrast	Usually Not Appropriate	☢☢☢
FDG-PET/CT brain	Usually Not Appropriate	☢☢☢
MEG	Usually Not Appropriate	O
MRI functional (fMRI) head without IV contrast	Usually Not Appropriate	O
HMPAO SPECT or SPECT/CT brain ictal and interictal	Usually Not Appropriate	☢☢☢

This imaging modality was ordered by the ER physician

Findings (unlabeled)



Findings: (labeled)

Serpiginous dilated vascular structure within the superior left cerebral hemisphere

Dilated tubular structure extending to the superior sagittal sinus

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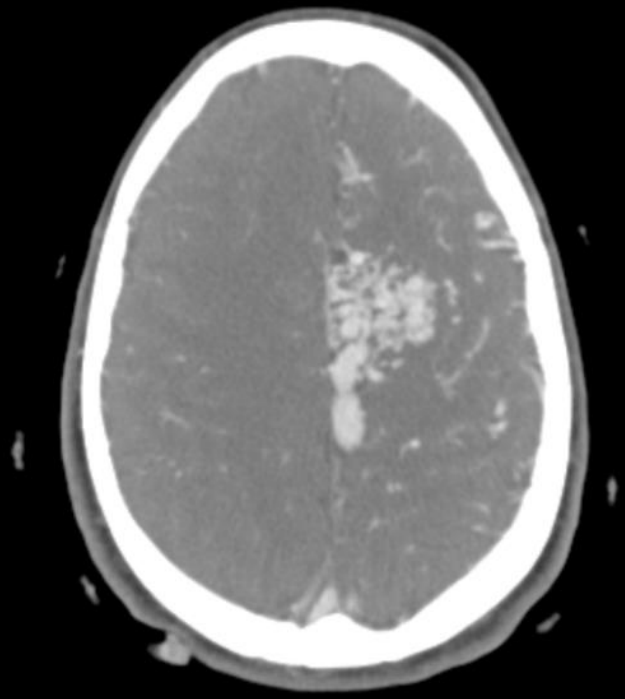
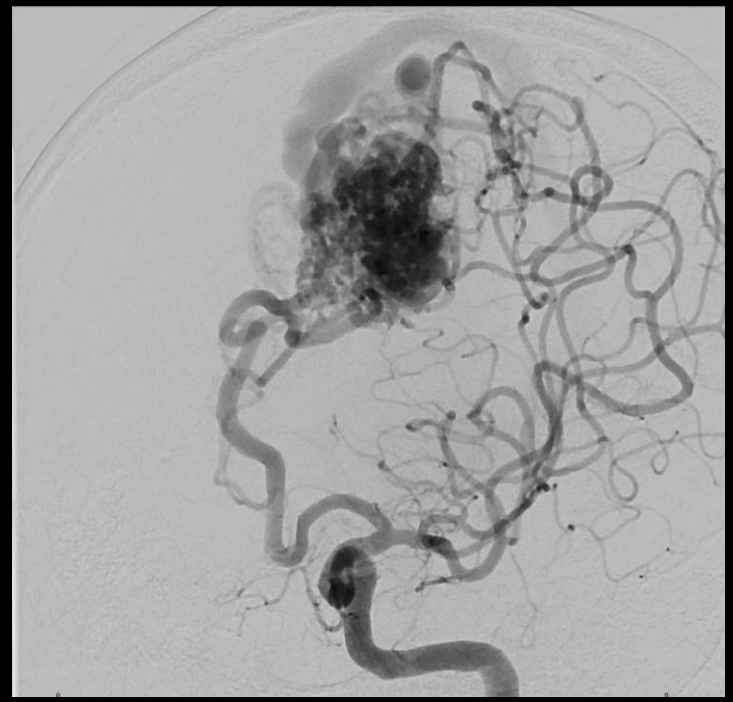
Findings: (unlabeled)

A Head CTA and Cerebral Angiography were Ordered





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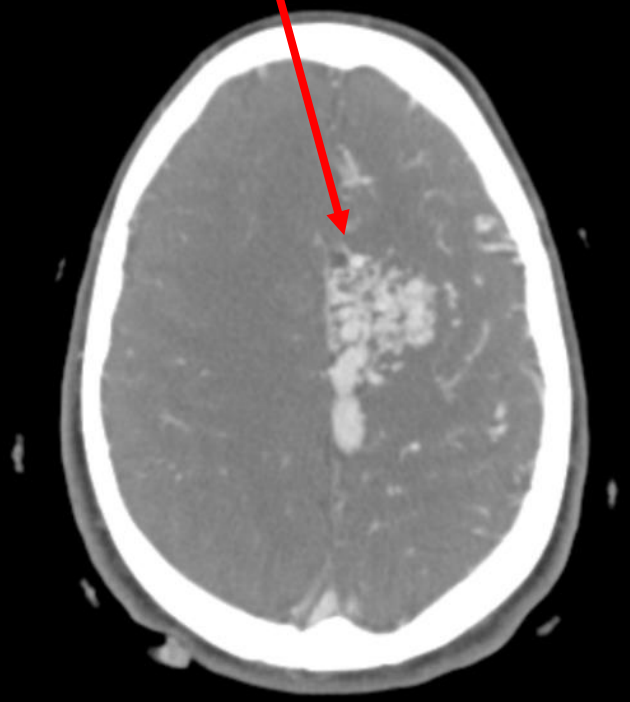
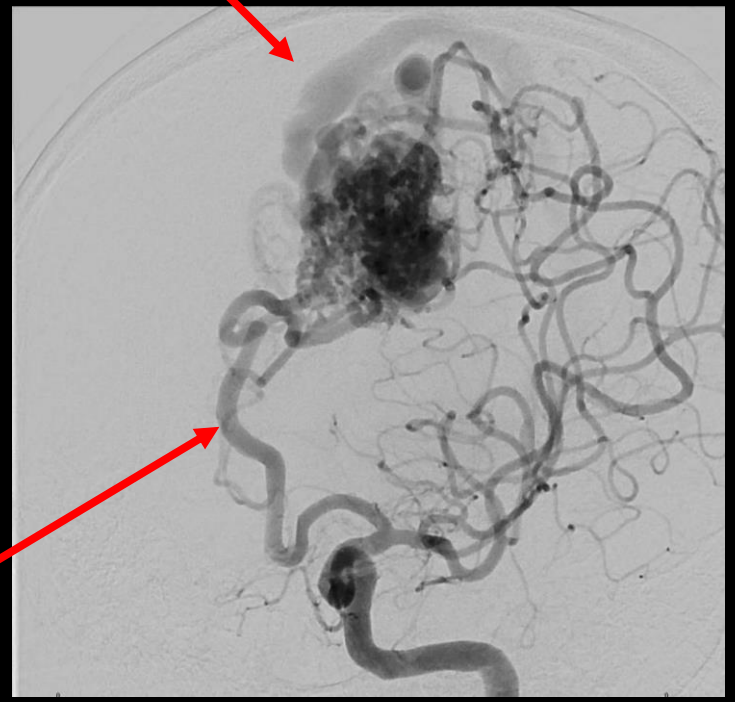
Findings: (labeled)

Tangle of vessels with a “Bag of Worms” appearance



Large vein draining into the superior sagittal sinus



Feeding vessel from ACA

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Final Dx:

Intracranial Arteriovenous Malformation

Case Discussion

- Abnormal communication between arteries and veins without intervening capillary bed. 27-32% of can have dual arterial supply.
- Most commonly present with intracranial hemorrhage and/or seizure
- AVM rupture with intracranial hemorrhage is feared complication
- Treatment options include embolization, radiation, or surgical resection.
- Spetzler-Martin Grading scale used to risk-stratify possible surgical candidates. Scores of 4-5 are often managed without surgery.

Characteristic	Number of points assigned
Size of AVM	
Small (<3 cm)	1 point
Medium (3–6 cm)	2 points
Large (>6 cm)	3 points
Location	
Noneloquent site	0 points
Eloquent site*	1 point
Pattern of venous drainage	
Superficial only	0 points
Deep component	1 point

*Sensorimotor, language, visual cortex, hypothalamus, thalamus, internal capsule, brain stem, cerebellar peduncles, or cerebellar nuclei.

Spetzler-Martin Grading Scale

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AVM Imaging Findings

- CT without contrast
  - Hemorrhage if bleeding, iso-attenuated or hyper-attenuated serpentine vessels
  - 25-30% AVMs present with calcification
  - Small AVMs may not be conspicuous
- CTA: Better visualizes abnormal vascularization, with a “bag of worms” appearance
- MRI: “honeycomb” appearance of flow voids, T2-hypointense enhancing nidus and draining veins
- Angiography provides the best characterization of vascular supply and drainage

References:

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