AMSER Case of the Month:

Aneurysmal Subarachnoid Hemorrhage

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Patient Presentation

- 71 year old female presents with severe headache and syncope
- Non-contrast CT scan at an outside hospital showed:
  - subarachnoid hemorrhage (SAH)
  - intraventricular hemorrhage (IVH)

What Imaging Should We Order?

Select the applicable ACR Appropriateness Criteria

Variant 7: **Proven SAH by lumbar puncture or imaging.**

Radiologic Procedure	Rating	Comments	RRL*
Arteriography cervicocerebral	9	Catheter angiography and CTA/MRA are alternative examinations.	☢☢☢
CT head without IV contrast	8	This procedure can be used to follow hemorrhage evolution and to assess for complications related to SAH.	☢☢☢
CTA head with IV contrast	8	Can be performed after NCCT while patient is still on the CT scan table. CTA has similar sensitivity and higher specificity than MRA for aneurysm detection.	☢☢☢
MRA head without IV contrast	8	MRA has similar sensitivity but lower specificity than CTA for aneurysm detection. Useful in patients with renal failure or contrast allergy.	O
MRA head without and with IV contrast	8	MRA has similar sensitivity but lower specificity than CTA for aneurysm detection.	O
MRI head without IV contrast	6		O
MRI head without and with IV contrast	6		O
MRA neck without IV contrast	6		O
MRA neck without and with IV contrast	6		O
CTA neck with IV contrast	6		☢☢☢
US transcranial with Doppler	5		O
CT head without and with IV contrast	5		☢☢☢
CT head with IV contrast	3		☢☢☢

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

Angiography evaluation/treatment was requested

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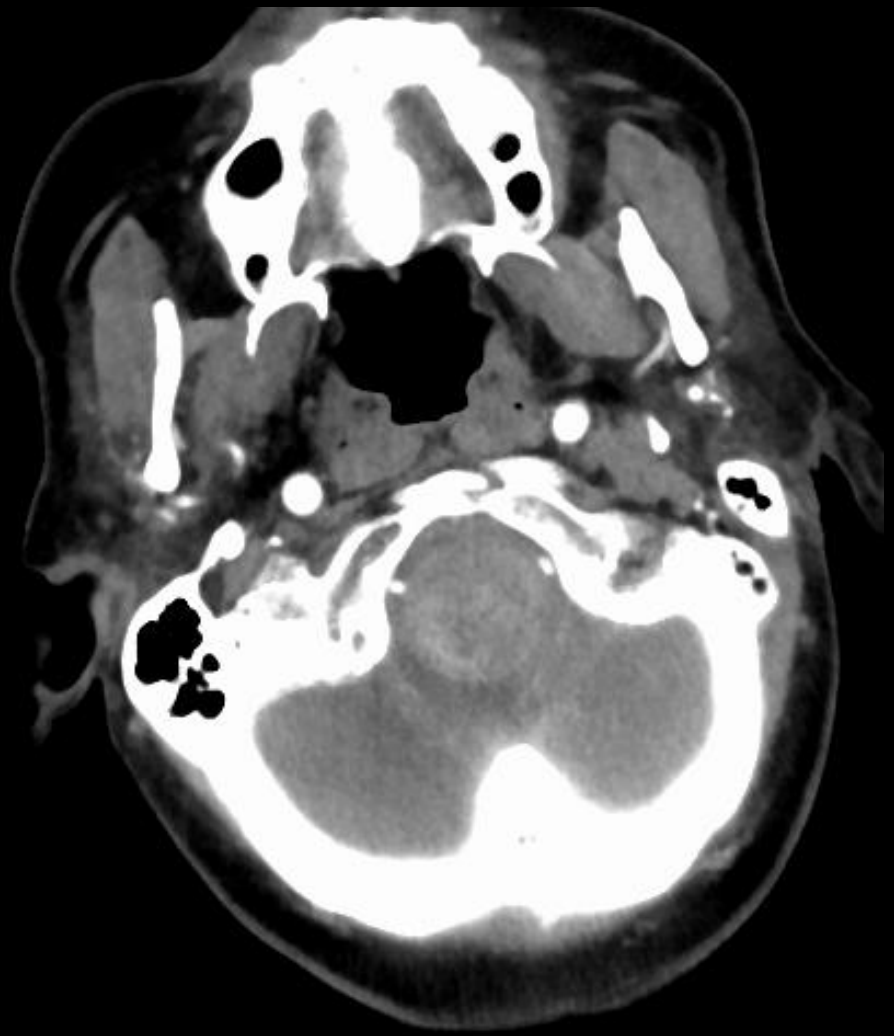
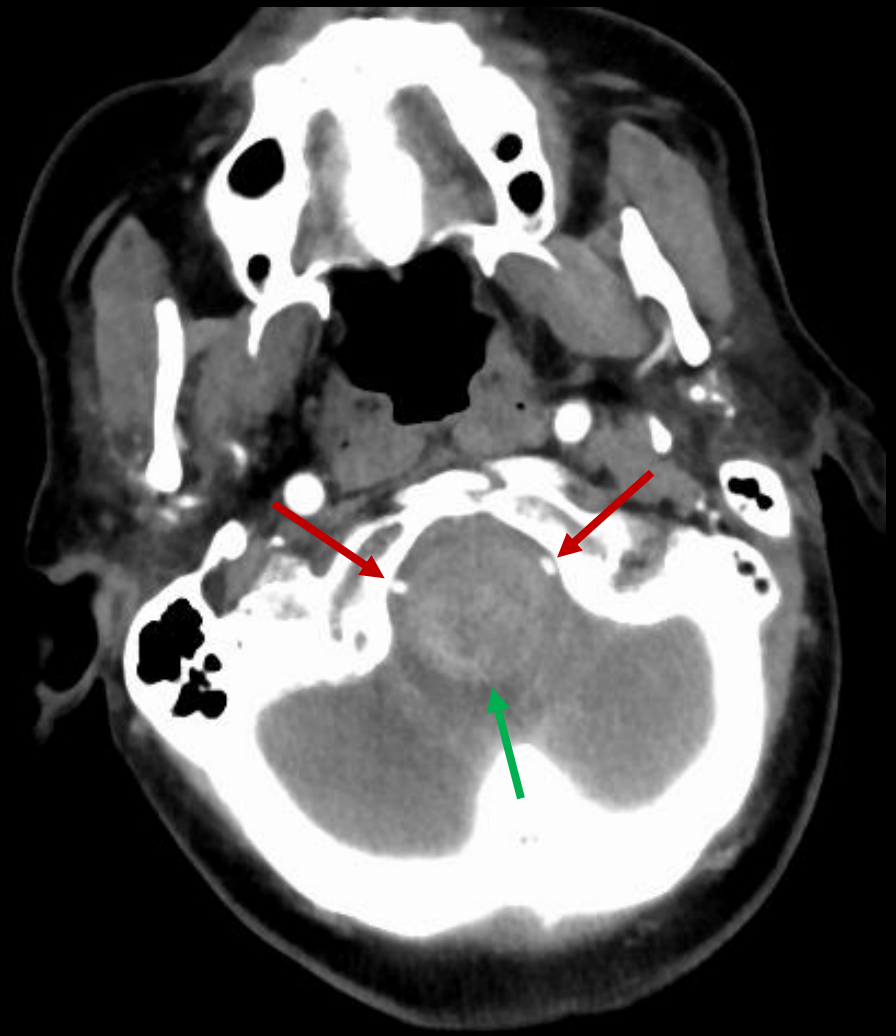
Findings (unlabeled)

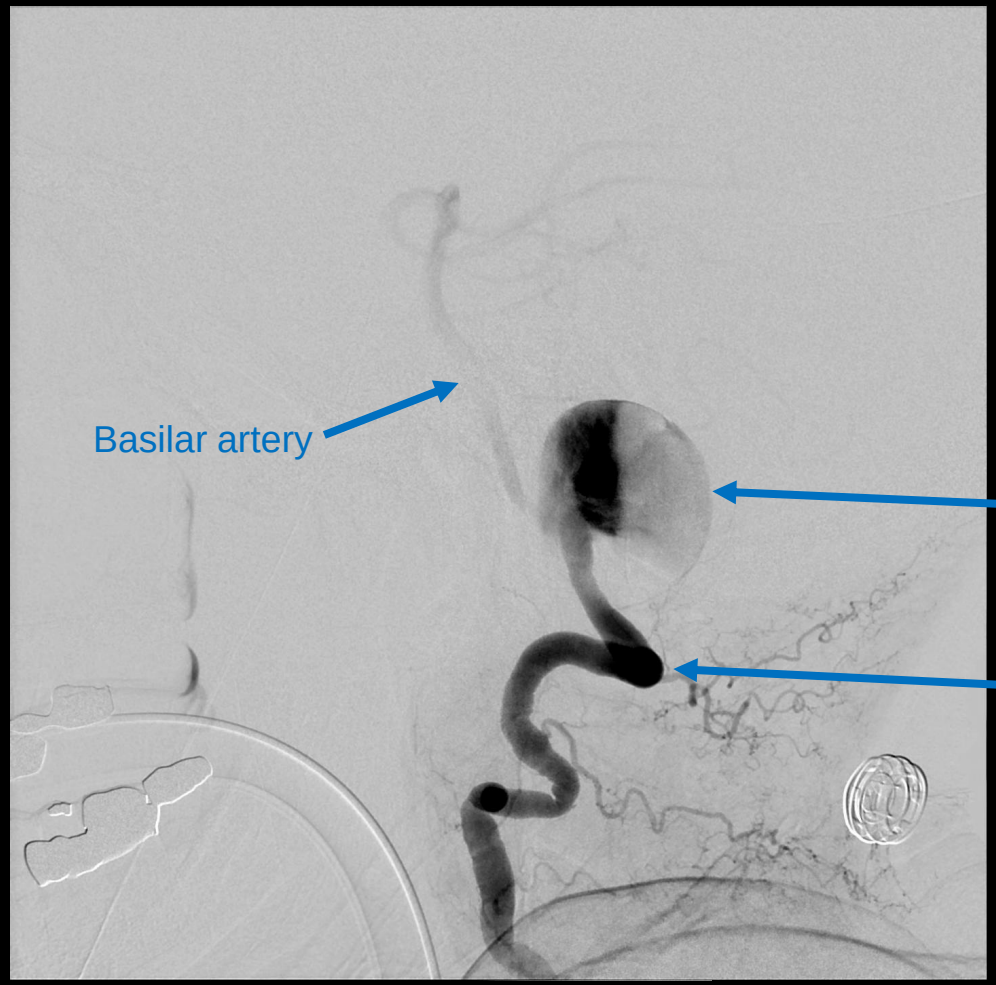


Findings (labeled)



Red arrows = vertebral arteries

Green arrow = aneurysm



Final Dx:

Subarachnoid hemorrhage secondary to left vertebral artery aneurysm

Differential diagnosis for subarachnoid and intraventricular hemorrhage:

- Trauma
- Aneurysm
- AVM
- Vasculitis
- No cause determined
- Multiple other causes

Imaging Findings: Intracranial Aneurysm

- Saccular outpouching from intracranial artery
- Often forms at branch points in the artery
- Typically opacifies with contrast material in arterial phase along with parent artery
- May fill with contrast partially or not at all due to thrombus within the aneurysm

Brief Clinical Description

- Treatment Options
  - Coil embolization (what was done in our case)
  - Flow diversion device
  - Surgical clipping
  - Sacrifice parent artery
- Prognosis
  - Potential complications include: rebleeding, vasospasm, hydrocephalus
  - Severity of clinical presentation is the strongest prognostic indicator

References:

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- Adams et al., Principles of Neurology, 6th ed, p841
- Lanzino G, Murad MH, d'Urso PI, Rabinstein AA. Coil embolization versus clipping for ruptured intracranial aneurysms: a meta-analysis of prospective controlled published studies. AJNR Am J Neuroradiol. 2013; 34:1764–1768
- Solenski NJ, Haley EC, Kassell NF, et al. Medical complications of aneurysmal subarachnoid hemorrhage: a report of the multicenter, cooperative aneurysm study. Participants of the Multicenter Cooperative Aneurysm Study. Crit Care Med. 1995; 23:1007–1017
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- ACR Appropriateness Criteria. Cerebrovascular disease—Variant 7

  https://acsearch.acr.org/docs/69478/Narrative/.