

# AMSER Case of the Month

## December 2022

77-year-old male in a motor vehicle accident

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# Patient Presentation

**History of present illness:** 77-year-old male presents for evaluation after a vehicle collision with complaints of bilateral shoulder pain and neck pain. He denies head injury, loss of consciousness, vision changes, chest pain or abdominal pain.

**Past medical history:** Deep vein thrombosis status-post IVC filter placement

**Surgical history:** Cervical spine fixation

**Medications:** Warfarin, Azithromycin, Cyclobenzaprine, Acetaminophen/Diphenhydramine

**Physical exam:** Seatbelt sign on left shoulder and neck region. Scattered ecchymoses on bilateral forearms.

# Vitals & Pertinent Labs

**Vitals:** Blood pressure: 147/79, Pulse: 125, Temp 37.2 C, Resp 18, SPO2 96%

## **Pertinent labs (reference values):**

Complete blood count:

Wbc 14.0 (3.6 - 10.4)

Hgb 12.4 (13.6 - 16.9)

Plt 252 (152 - 324)

Coags:

PTT 26.1 (25 to 35)

INR 1.1 (<1.5)

What Imaging Should We Order?

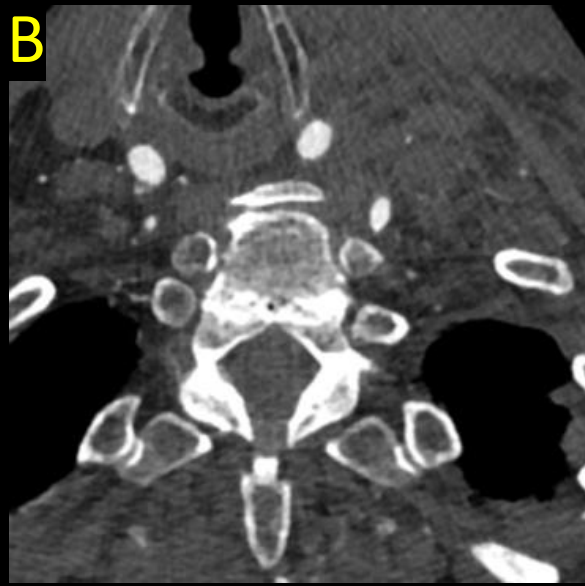
# Select the Applicable ACR Appropriateness Criteria

**Variant 2:** Major blunt trauma. Hemodynamically stable. Not otherwise specified. Initial imaging.

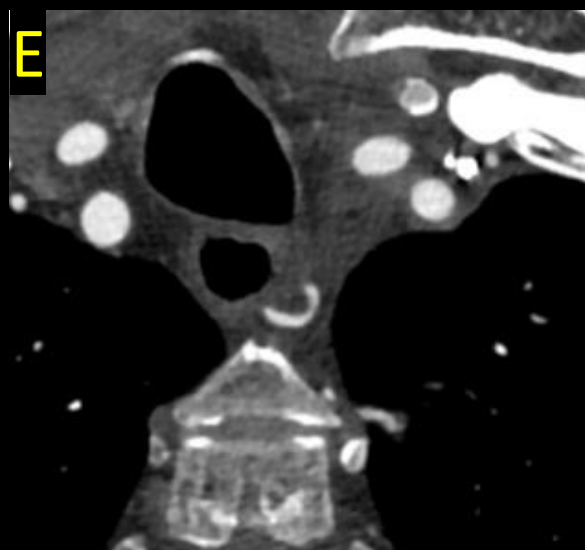
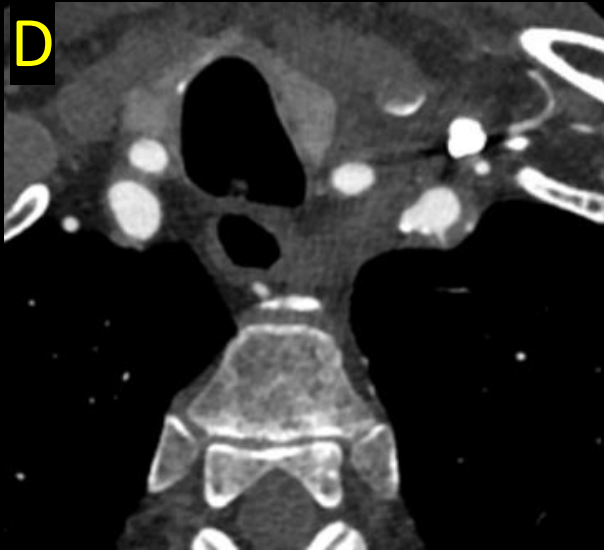
Procedure	Appropriateness Category	Relative Radiation Level
CT whole body with IV contrast	Usually Appropriate	⊕⊕⊕⊕
Radiography trauma series	Usually Appropriate	⊕⊕⊕
US FAST scan chest abdomen pelvis	Usually Appropriate	0
CT whole body without IV contrast	May Be Appropriate	⊕⊕⊕⊕
Fluoroscopy retrograde urethrography	Usually Not Appropriate	⊕⊕⊕
MRI abdomen and pelvis without and with IV contrast	Usually Not Appropriate	0
MRI abdomen and pelvis without IV contrast	Usually Not Appropriate	0

This imaging modality was ordered by the ER physician.

# Findings (Unlabeled)

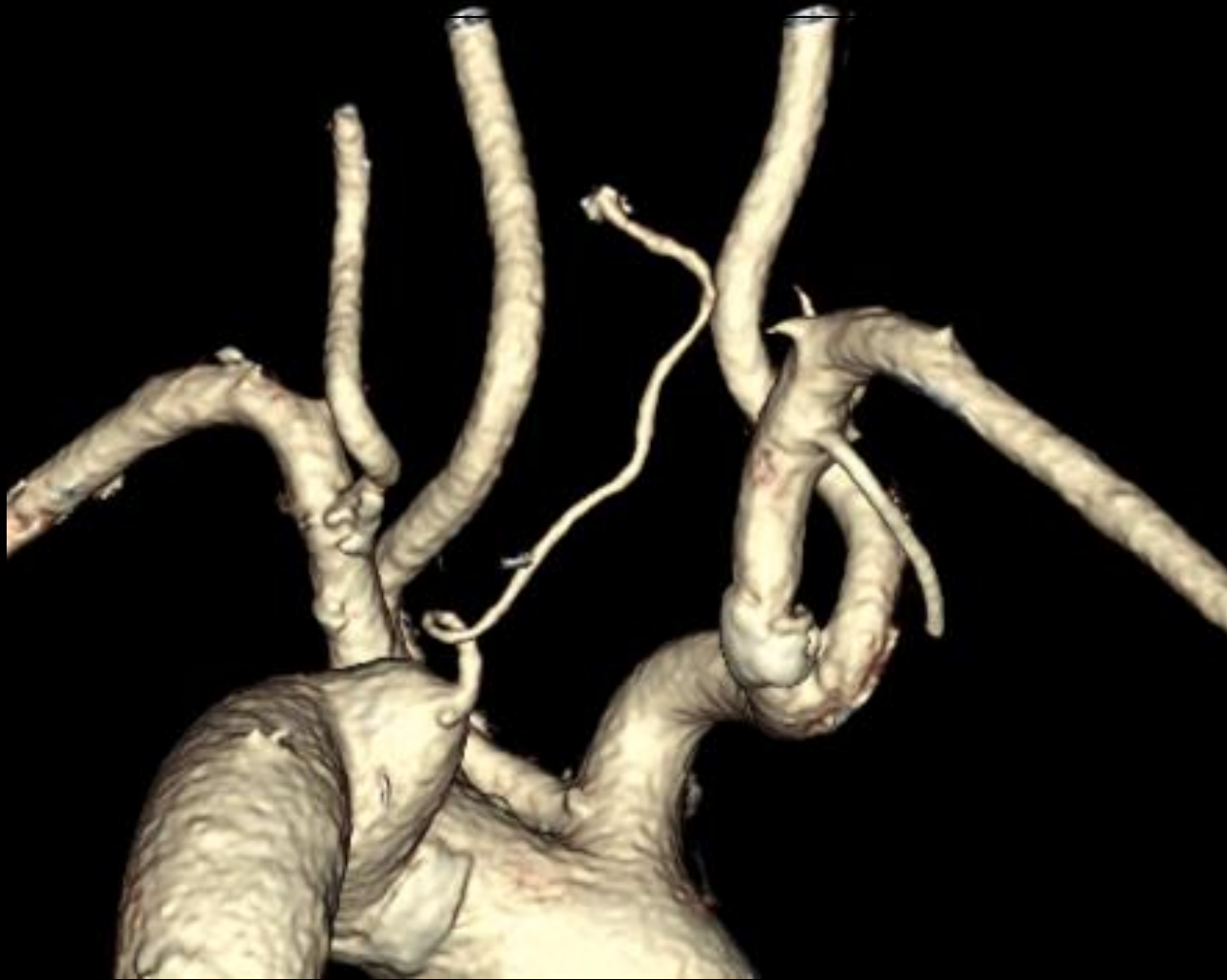


Hint #1: Follow the vessel labeled with the arrow in A.



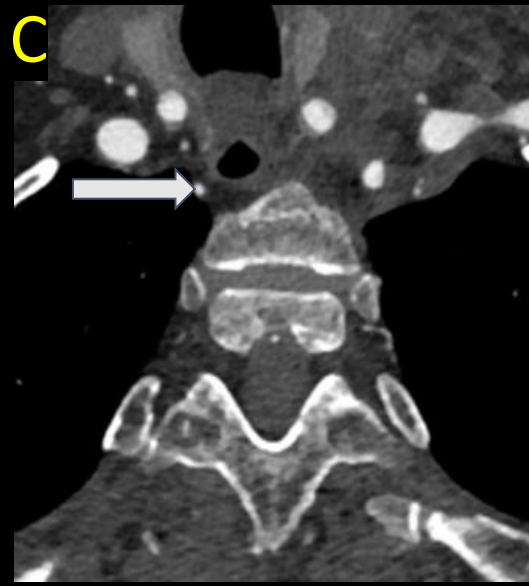
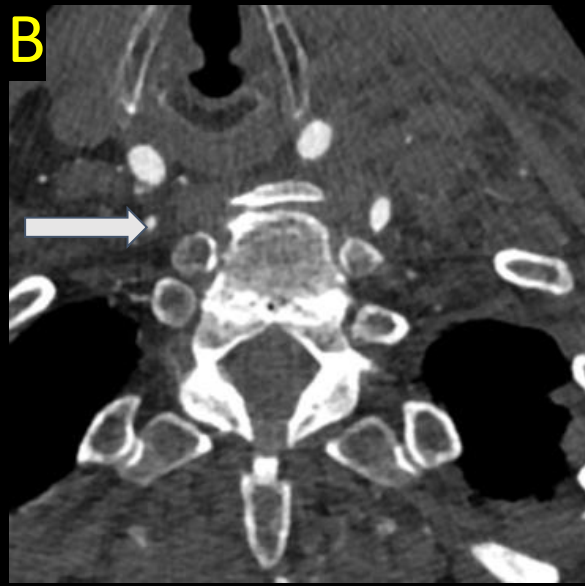
# Findings (Unlabeled)

3D rendering of the aorta and its arch branches

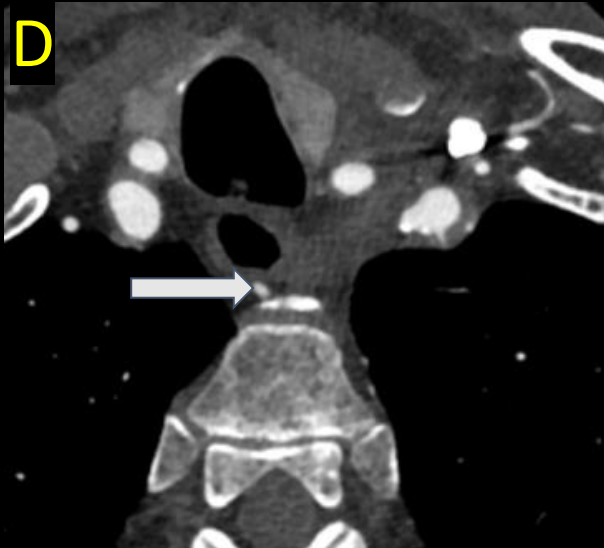


Hint #2:  
This vessel travels through  
the transverse foramen.

# Findings (Labeled)



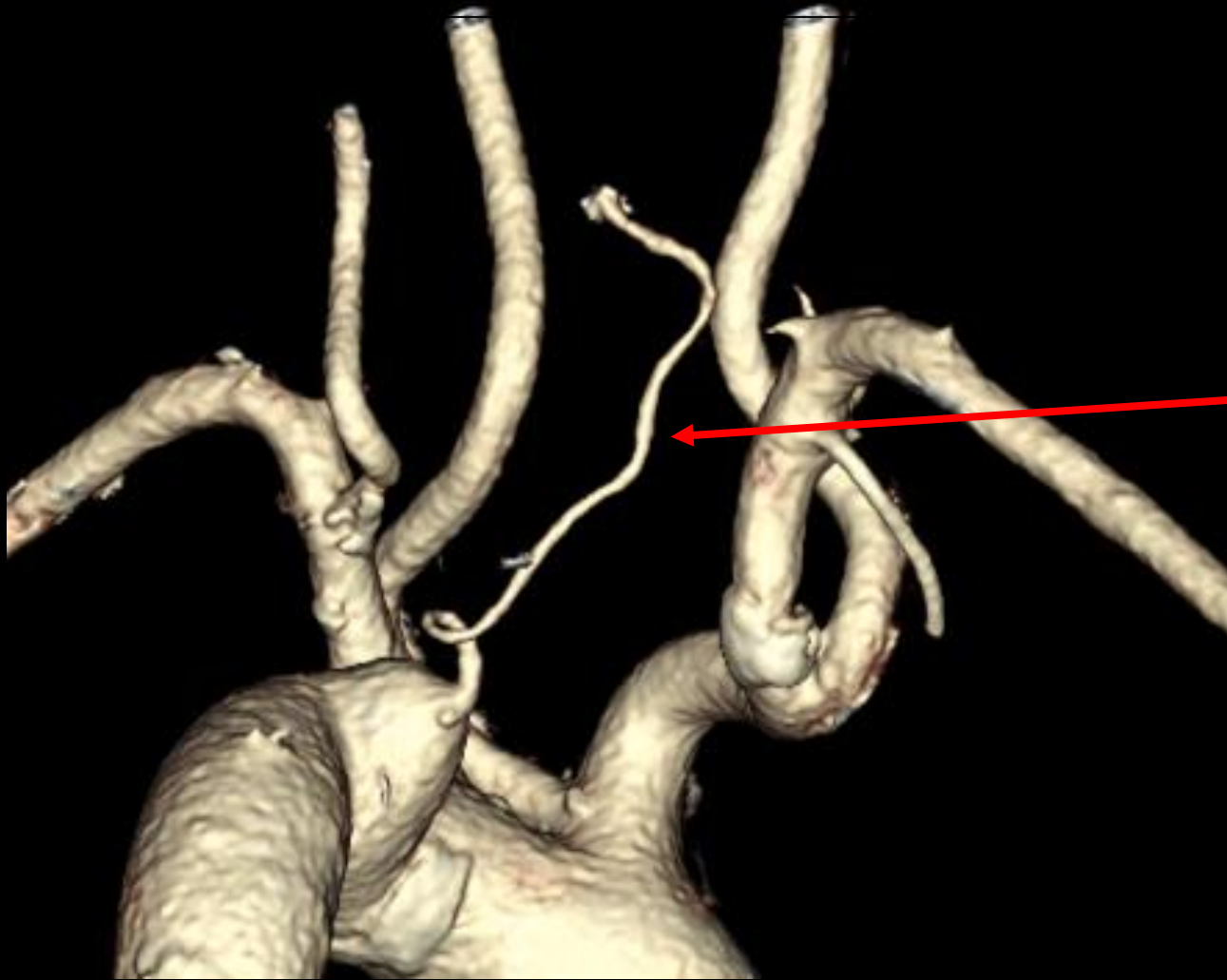
Right vertebral artery  
emerging directly from  
the aorta





# Findings (Labeled)

3D rendering of the aorta and its arch branches



Right vertebral artery emerging directly from the aorta

**Incidental Finding:  
Anomalous right vertebral artery originating from the  
aortic arch**

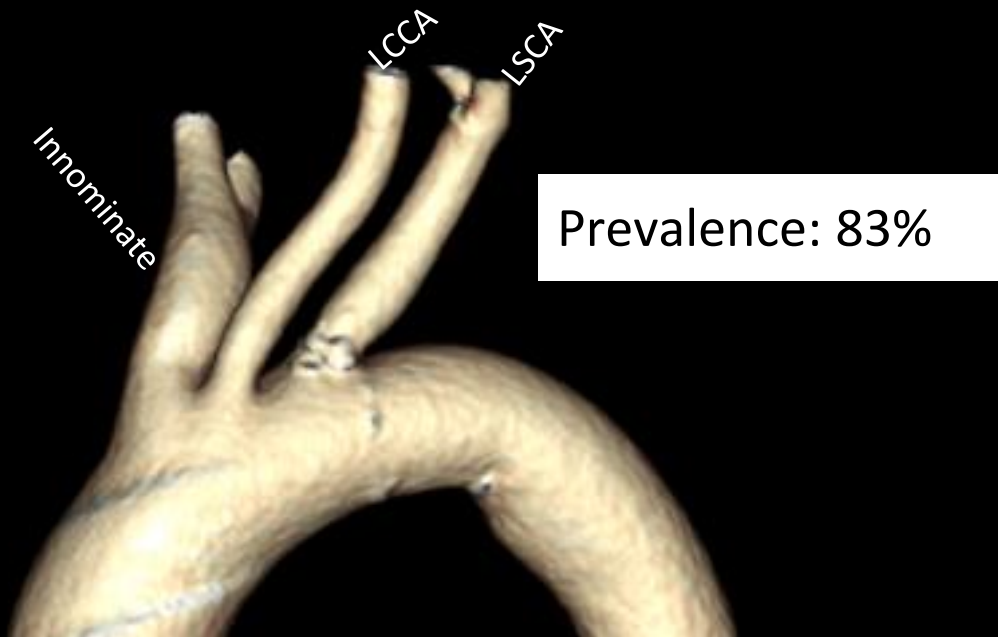
# Anomalous Right Vertebral Artery

- Most commonly, the right vertebral artery (RVA) originates from the ipsilateral subclavian artery.
- Numerous variations of anomalous RVAs and left vertebral arteries (LVA) have been reported.
- However, an anomalous RVA originating from the aortic arch is especially rare.
  - About 23 cases have ever been reported as of Feb. 2022 (Nandi, 2022).
- In this patient, the anomalous RVA is hypoplastic and the LVA dominant.
  - Co-dominance and dominant anomalous RVAs have also been reported.

# Aortic Arch Branching Variation

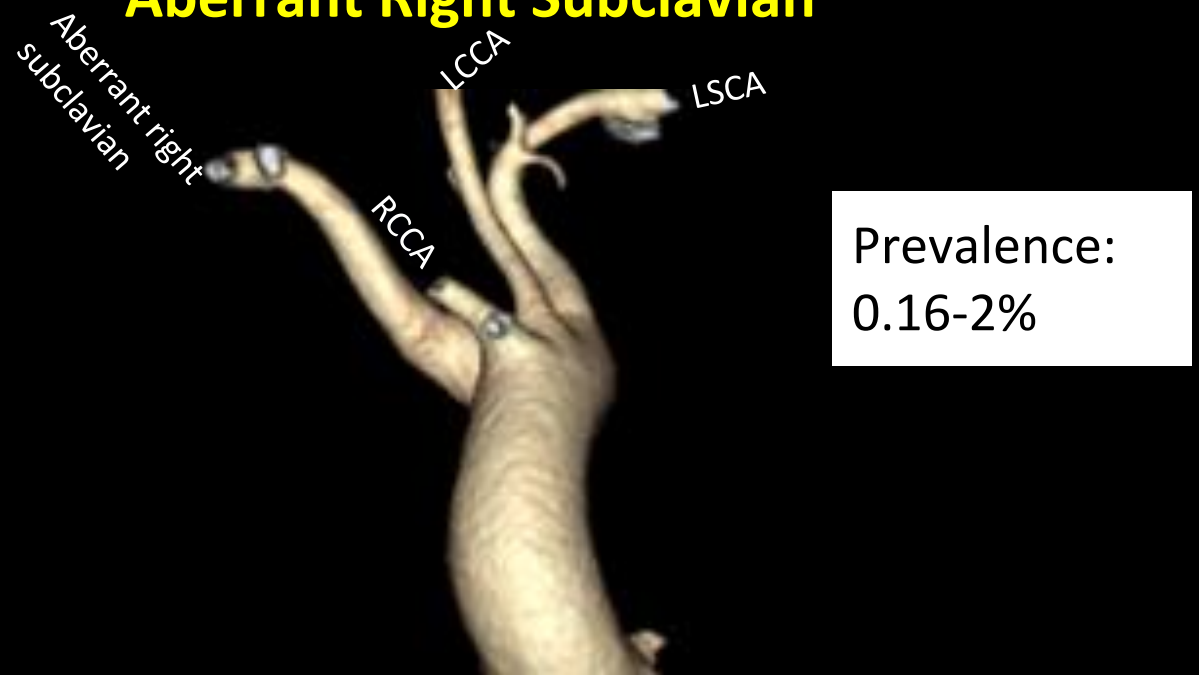
- Aortic arch branch anatomical variants are common and frequent incidental findings on cross sectional imaging.
- More common variations include 2, 3, and 4 vessel arch and an aberrant right subclavian artery.

## 3 Vessel Arch



Branching order: Innominate, left common carotid (LCCA), left subclavian (LSCA)

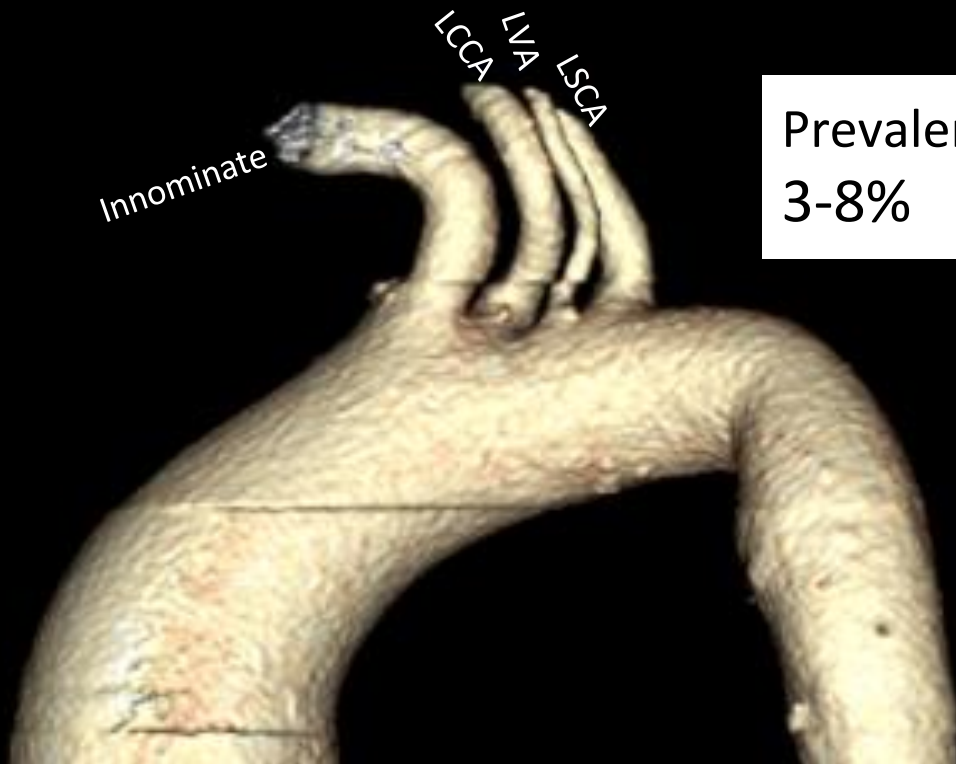
## Aberrant Right Subclavian



Branching order: Right common carotid (RCCA), LCCA, LSCA, aberrant right subclavian

# Aortic Arch Branching Variation *Cont.*

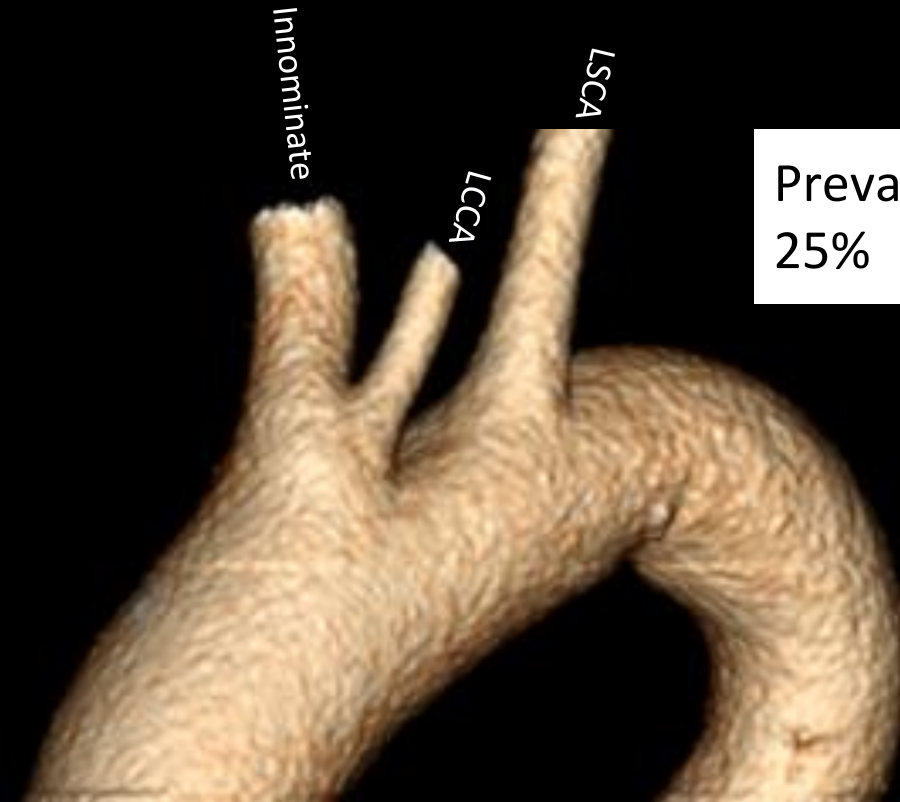
## 4 Vessel Arch



Prevalence:  
3-8%

Branching order: Innominate, LCCA, LVA and LSCA

## 2 Vessel Arch



Prevalence: 8-  
25%

Branching order: Innominate & LCCA with  
common trunk, LSCA

# Clinical Significance

- Aortic arch branching variations are generally incidental and clinically insignificant.
- However, it is important to document such findings as they become relevant to avoid vascular injury for head/neck surgery and angiography.
  - Identifying variants may prevent misdiagnosis of a blocked vessel during angiography.

# References

Nandi D, Shaw M, Taxak A, Kumar S. Anomalous origin of right vertebral artery from aortic arch distal to origin of left subclavian artery in a patient with aneurysm of aortic arch and type B dissection of aorta. *BMJ Case Rep.* 2022 Mar 15;15(3):e248004. doi: 10.1136/bcr-2021-248004.

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