AMSER Case of the Month
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77-year-old male in a motor vehicle accident

Emmanuel Mgboji, MS-2
University of Michigan Medical School

Daniel Schneider, MD
University of Michigan, Department of Radiology

Elizabeth Lee, MD
University of Michigan Medical School
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

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Appropriateness Category</th>
<th>Relative Radiation Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT whole body with IV contrast</td>
<td>Usually Appropriate</td>
<td>5</td>
</tr>
<tr>
<td>Radiography trauma series</td>
<td>Usually Appropriate</td>
<td>3</td>
</tr>
<tr>
<td>US FAST scan chest abdomen pelvis</td>
<td>Usually Appropriate</td>
<td>1</td>
</tr>
<tr>
<td>CT whole body without IV contrast</td>
<td>May Be Appropriate</td>
<td>3</td>
</tr>
<tr>
<td>Fluoroscopy retrograde urethrography</td>
<td>Usually Not Appropriate</td>
<td>1</td>
</tr>
<tr>
<td>MRI abdomen and pelvis without and with IV contrast</td>
<td>Usually Not Appropriate</td>
<td>1</td>
</tr>
<tr>
<td>MRI abdomen and pelvis without IV contrast</td>
<td>Usually Not Appropriate</td>
<td>1</td>
</tr>
</tbody>
</table>

This imaging modality was ordered by the ER physician.
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.
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)
- Prevalence: 83%

Aberrant Right Subclavian
- Branching order: Right common carotid (RCCA), LCCA, LSCA, aberrant right subclavian
- Prevalence: 0.16-2%
Aortic Arch Branching Variation Cont.

4 Vessel Arch
- Branching order: Innominate, LCCA, LVA and LSCA
- Prevalence: 3-8%

2 Vessel Arch
- Branching order: Innominate & LCCA with common trunk, LSCA
- Prevalence: 8-25%
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


