AMSER Case of the Month:

Aneurysmal Subarachnoid Hemorrhage

Megan Rajagopal, MS4 - University of Kentucky
Dr. Douglas Lukins, Assistant Professor - University of Kentucky
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

<table>
<thead>
<tr>
<th>Radiologic Procedure</th>
<th>Rating</th>
<th>Comments</th>
<th>RRL*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arteriography cervicocerebral</td>
<td>9</td>
<td>Catheter angiography and CTA/MRA are alternative examinations.</td>
<td>☐ ☐ ☐</td>
</tr>
<tr>
<td>CT head without IV contrast</td>
<td>8</td>
<td>This procedure can be used to follow hemorrhage evolution and to assess for complications related to SAH.</td>
<td>☐ ☐ ☐</td>
</tr>
<tr>
<td>CTA head with IV contrast</td>
<td>8</td>
<td>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.</td>
<td>☐ ☐ ☐</td>
</tr>
<tr>
<td>MRA head without IV contrast</td>
<td>8</td>
<td>MRA has similar sensitivity but lower specificity than CTA for aneurysm detection. Useful in patients with renal failure or contrast allergy.</td>
<td>☐</td>
</tr>
<tr>
<td>MRA head without and with IV contrast</td>
<td>8</td>
<td>MRA has similar sensitivity but lower specificity than CTA for aneurysm detection.</td>
<td>☐</td>
</tr>
<tr>
<td>MRI head without IV contrast</td>
<td>6</td>
<td></td>
<td>☐</td>
</tr>
<tr>
<td>MRI head without and with IV contrast</td>
<td>6</td>
<td></td>
<td>☐</td>
</tr>
<tr>
<td>MRA neck without IV contrast</td>
<td>6</td>
<td></td>
<td>☐</td>
</tr>
<tr>
<td>MRA neck without and with IV contrast</td>
<td>6</td>
<td></td>
<td>☐</td>
</tr>
<tr>
<td>CTA neck with IV contrast</td>
<td>6</td>
<td></td>
<td>☐ ☐ ☐</td>
</tr>
<tr>
<td>US transcranial with Doppler</td>
<td>5</td>
<td></td>
<td>☐</td>
</tr>
<tr>
<td>CT head without and with IV contrast</td>
<td>5</td>
<td></td>
<td>☐ ☐ ☐</td>
</tr>
<tr>
<td>CT head with IV contrast</td>
<td>3</td>
<td></td>
<td>☐ ☐ ☐</td>
</tr>
</tbody>
</table>

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
Findings (labeled)

Red arrows = vertebral arteries
Green arrow = aneurysm

Basilar artery
Aneurysm
Left vertebral artery
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:

• Adams et al., Principles of Neurology, 6th ed, p841
• Greenberg, Mark. “SAH and Aneurysms.” Handbook of Neurosurgery. 8th Ed. Thieme, 2016. 1156-1231. Print
• ACR Appropriateness Criteria. Cerebrovascular disease—Variant 7
  https://acsearch.acr.org/docs/69478/Narrative/.