AMSER Case of the Month
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25 y/o M with 3-month history of facial and neck swelling

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Patient Presentation

- HPI: 25 y/o M patient with 3-month history of facial/neck swelling, new headache, dizziness
- PMHx: obesity, asthma, OSA, GERD, recent wisdom tooth extraction
- PSHx: remote inguinal hernia repair + tonsillectomy/adenectomy
- Physical Exam:
  - Diffuse facial/neck edema, tachycardia
  - No upper extremity edema
- Vitals:
  - HR 102
  - BP 173/101
  - T: 97.9F
  - Resp 20
  - SpO2 97%
- Recent Labs (Outpatient):
  - Positive ANA
  - Elevated CRP + ESR
  - 3+ proteinuria and hematuria
What Imaging Should be Ordered?

- Concern for SVC syndrome / thrombophlebitis

**American College of Radiology**
**ACR Appropriateness Criteria®**
**Suspected Upper-Extremity Deep Vein Thrombosis**

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Appropriateness Category</th>
<th>Relative Radiation Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>US duplex Doppler upper extremity</td>
<td>Usually Appropriate</td>
<td>○</td>
</tr>
<tr>
<td>CTV upper extremity with IV contrast</td>
<td>May Be Appropriate</td>
<td>★★</td>
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<tr>
<td>MRV upper extremity without and with IV contrast</td>
<td>May Be Appropriate</td>
<td>○</td>
</tr>
<tr>
<td>MRV upper extremity without IV contrast</td>
<td>May Be Appropriate</td>
<td>○</td>
</tr>
<tr>
<td>Catheter venography upper extremity</td>
<td>Usually Not Appropriate</td>
<td>★★★★</td>
</tr>
<tr>
<td>Nuclear medicine venography upper extremity</td>
<td>Usually Not Appropriate</td>
<td>★★★</td>
</tr>
<tr>
<td>Radiography chest</td>
<td>Usually Not Appropriate</td>
<td>★</td>
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“Delayed imaging to 90 to 120s can permit evaluation of the central veins. Used to assess the jugular veins, brachiocephalic veins, and the superior vena cava”

POCUS internal jugular vein performed in ED
CT chest with IV contrast: 90 s delay
Findings (Labeled)

CT chest with IV contrast: 90s delay

Limited contrast opacification of the SVC

Limited contrast opacification of the L brachiocephalic vein
Findings (Unlabeled)
Findings (Labeled)

Extensive collateral vessels within R chest subcutaneous soft tissues and mediastinum
SVC Obstruction: Pathophysiology

- **Pathophysiology:** extrinsic compression, intrinsic stenosis, or thrombosis of the SVC
  - Most commonly related to malignancy (70%)
  - Central venous catheters (25%)

**Our Patient:**
- 25 y/o
- no known malignancy
- no central line
SVC Obstruction: Clinical Presentation

- **Clinical Presentation** depends on **speed, severity, and location** of the obstruction
  - Typical symptoms include facial and neck swelling, facial flushing, bilateral upper extremity swelling, neurological signs, dyspnea, headache, and cough
    - Can be life-threatening (cerebral/ laryngeal edema, diminished cardiac reserve)
  - Collateral channels formed to restore venous return if **chronic**
SVC Obstruction: Pathophysiology

- There is venous congestion proximal to the obstruction distending the veins of the neck, upper extremity, and face
- Causes engorgement of collateral vessels in the wall of the thorax/mediastinum which redirect bloodflow to the IVC

SVC Obstruction: Consider hypercoagulability, underlying malignancy, auto-immune

- Our patient was found to have **catastrophic antiphospholipid syndrome**
- Shortly after diagnosis, they developed severe abdominal pain
- Concern for acute mesenteric ischemia
- Additional imaging was obtained

<table>
<thead>
<tr>
<th>Variant 1: Suspected acute mesenteric ischemia. Initial imaging.</th>
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<tr>
<td><strong>Procedure</strong></td>
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<tr>
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<tr>
<td>CTA abdomen and pelvis with IV contrast</td>
</tr>
<tr>
<td>CT abdomen and pelvis with IV contrast</td>
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<tr>
<td>Arteriography abdomen</td>
</tr>
<tr>
<td>MRA abdomen and pelvis without and with IV contrast</td>
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<tr>
<td>Radiography abdomen</td>
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<tr>
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<td>MRA abdomen and pelvis without IV contrast</td>
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</table>
Findings (Unlabeled)
Focal Hepatic Hot Spot Sign: pseudo lesion of the liver

*No mesenteric ischemia*
SVC Syndrome: Other Findings

Focal Hepatic Hot Spot Sign:

- Abnormal contrast accumulation in the liver (segment IV) from contrast being injected into upper limb vein, diverted into collateral pathways to be directed to the IVC
SVC Syndrome: Management

• Treat underlying etiology: malignancy, central line

• Endovascular: angioplasty, thrombolysis, stenting

• Surgical: bypass grafting and reconstruction

SVC and L brachiocephalic thrombus on subsequent CTA
Summary: Imaging Superior Vena Cava Obstruction

- **Pathophysiology**: compression, stenosis, or thrombosis
  - Most often caused by malignancy or central venous catheters
  - Can be an emergency
- **Venous filling defect of the superior vena cava on CT with IV contrast**
- **Chronic SVC obstruction can lead to collateral vessels in the subcutaneous tissues and mediastinum**
- **Focal hepatic hot spot sign in segment 4**
References:


