RADY 401 Case Presentation: Dural Venous Sinus Thrombosis (DVST) Workup

Jamison Kline MS4 | August 4th, 2023
Focused patient history and workup

PHx: 32 y.o. M with unremarkable PMHx presenting to ED with progressive frontal headache and nausea c/b panic attack with SOB and RUE paresthesia in route to hospital.


Workup and Tx:
- CMP, CBC, lipase, aPTT, PT-INR
  - Largely unremarkable (signs of dehydration from emesis)
- Zofran and IVFs

Differential:
- Subarachnoid hemorrhage
- Arteriovenous malformation
- Migraine
- Tension headache
List of imaging studies

- Non-contrast Head CT
- Head CT Venogram
Non-Contrast Head CT

Sagittal Plane

Series 6
Image 29

- Superior sagittal sinus
- Inferior sagittal sinus
- Vein of Galen
- Pineal gland
- Straight sinus

8.7 mm
Coronal

Superior sagittal sinus

Pineal gland

Axial

Pineal gland

Choroid plexus

Straight sinus

Sinus confluence

Non-Contrast Head CT
Head CT Venogram with IV contrast

Sagittal Plane
Series 7
Image 28
Patient treatment and outcome

• Head CTV findings negative for suspected DVST on non-contrast head CT
• ED diagnosis: Headache/Migraine
• Discontinued heparin and treated with migraine cocktail
• Discharged
Non-contrast head CT findings

• Hyperdense signal involving the SSS (8.7 mm [N=4-10 mm])¹, inferior sagittal sinus, vein of Galen, and straight sinus with possible dense clot sign at sinus confluence posteriorly²

• Pineal gland and choroid plexus calcifications
  - Age-related neurodegenerative finding³,⁴

• Suspected dural venous sinus thrombosis (DVST)
  - Neurology consulted
  - Started heparin
  - Further characterization via Head CT Venogram
Non-contrast CT: Exam appropriateness

- **ACR Appropriateness Criteria – Variant 1**: Sudden onset severe headache that reaches maximal severity within one hour. Initial imaging.\(^5\)
  - Non-contrast head CT is gold standard for initial assessment\(^4\) in setting of acute headache with suspected subarachnoid hemorrhage
  - Sensitivity: 41 - 73%\(^6\)
  - Specificity: 97 - 100%\(^6\)
  - Cost: $1,200
  - Radiation: 2.1 mSv

### Variant 1:

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Appropriateness Category</th>
<th>Relative Radiation Level</th>
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</thead>
<tbody>
<tr>
<td>CT head without IV contrast</td>
<td>Usually Appropriate</td>
<td>✔️ ✔️ ✔️ ✔️ ✔️</td>
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<tr>
<td>CTA head with IV contrast</td>
<td>May Be Appropriate</td>
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<td>Arteriography cervicocerebral</td>
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<tr>
<td>MRA head with IV contrast</td>
<td>Usually Not Appropriate</td>
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<td>MRI head with IV contrast</td>
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<td>MRI head without IV contrast</td>
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<td>MRV head with IV contrast</td>
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<tr>
<td>CT head without and with IV contrast</td>
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<tr>
<td>CTV head with IV contrast</td>
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Head CTV findings

• Unremarkable Head CT Venogram
• No filling defects or evidence of dural sinus thrombosis
• No evidence of hemorrhage, infarction, or mass
Head CTV: Exam appropriateness

- ACR Appropriateness Criteria – Variant 6: Suspected dural venous sinus thrombosis
  - Appropriate for further characterization\(^7\)
- CTV sensitivity and specificity: 100\(^8\)
- Cost: $1,200
- Radiation: 3.2 mSv

<table>
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<th>Radiologic Procedure</th>
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<th>RRL*</th>
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<tr>
<td>MR venography head without and with IV contrast</td>
<td>9</td>
<td>Parenchymal imaging and vascular brain imaging with CT or MR should be considered. With contrast is preferred over MRV without contrast.</td>
<td>O</td>
</tr>
<tr>
<td>MR venography head without IV contrast</td>
<td>8</td>
<td>Parenchymal imaging and vascular brain imaging with CT or MR should be considered. Can be useful in the patient with a contraindication to contrast.</td>
<td>O</td>
</tr>
<tr>
<td>CT venography head with IV contrast</td>
<td>8</td>
<td>CTV can be obtained while the patient is still on the CT scan table after NCCT and can be obtained rapidly in the emergent setting. Postcontrast image timing can be optimized for evaluation of the intracranial venous structures.</td>
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\(^7\) Appropriate for further characterization

\(^8\) CTV sensitivity and specificity: 100%
Case Comparison

Our Patient

\[ \iff \text{NCCT} \]

\[ \implies \text{CTV} \]

Vs.

DVST (+) Case

\[ \iff \text{NCTT} \]

\[ (\text{Dense triangle sign}) \]

\[ \implies \text{CTV} \]

\[ (\text{filling defect}) \]
Test Yourself
UNC Top Three

1. Non-contrast head CT is the preferred initial imaging for acute headache with maximal onset within first hour. Useful for ruling out subarachnoid hemorrhage.

2. Head CT Venogram is very sensitive and specific for diagnosis of suspected DVST, especially following a NCCT.

3. Choroid plexus and pineal gland calcifications are common incidental findings and age-related neurodegenerative manifestations.
References


