Patient with Aggregatibacter infective endocarditis with emboli to the brain presents for follow-up imaging.

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HPI: 64-year-old woman with no significant PMH presents with 3 months of gradual right, then left vision loss.

Physical Exam: Bilateral panuveitis, no other focal deficits

Inpatient work-up reveals Aggregatibacter infectious endocarditis c/b multiple ring enhancing lesions due to septic emboli to the brain

Discharged on 8-week course of Metronidazole and Ceftriaxone
HPI: Following up to assess symptom/imaging progression

• Vision symptoms stable and feels better overall. Patient reports worsening ataxia; secondary fall 4 weeks post discharge. Now requires wheelchair.

• Denies headaches, fevers, chills, tingling or numbness, and incontinence

• Medications:
  • IV Ceftriaxone 2g BID
  • PO Metronidazole 500mg TID
What Imaging Should We Order?
Select the applicable ACR Appropriateness Criteria

<table>
<thead>
<tr>
<th>Clinical Condition:</th>
<th>Focal Neurologic Deficit</th>
<th>Radiologic Procedure</th>
<th>Rating</th>
<th>Comments</th>
<th>RRL*</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Single or multiple focal neurologic deficits, subacute onset, progressive or fluctuating.</td>
<td>MRI head without and with contrast</td>
<td>8</td>
<td>See statement regarding contrast in text under “Anticipated Exceptions.”</td>
<td>O</td>
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<td></td>
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<td>MRI head without contrast</td>
<td>8</td>
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<td>CT head without contrast</td>
<td>7</td>
<td>Acute screening.</td>
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<td>MRA head and neck without and with contrast</td>
<td>6</td>
<td>See statement regarding contrast in text under “Anticipated Exceptions.”</td>
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<td>MRA head and neck without contrast</td>
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<td></td>
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<td>CT head without and with contrast</td>
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<td>If MRI is unavailable or contraindicated. Consider CT perfusion.</td>
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<td>CTA head and neck with contrast</td>
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<td>For suspected vascular abnormality.</td>
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<td>CT head perfusion with contrast</td>
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<td></td>
<td>MRI head perfusion with contrast</td>
<td>5</td>
<td>See statement regarding contrast in text under “Anticipated Exceptions.”</td>
<td>O</td>
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<tr>
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<td>CT head with contrast</td>
<td>4</td>
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<td>MR spectroscopy head without contrast</td>
<td>4</td>
<td>For selected cases.</td>
<td>O</td>
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<td>MRI functional (fMRI) head without contrast</td>
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<td>O</td>
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<td>Tc-99m HMPAO SPECT head</td>
<td>3</td>
<td>For problem solving in HIV/AIDS.</td>
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<td>Thallium-201 SPECT head</td>
<td>3</td>
<td>For problem solving in HIV/AIDS.</td>
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<td>Arteriography cervicocerebral</td>
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<td>For problem solving.</td>
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<td>FDG-PET/CT head</td>
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</table>

*Relative Radiation Level: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate
Findings (unlabeled)

T2-FLAIR MRI

T2-FLAIR MRI
Findings (labeled)

Hyperintensities in bilateral dorsal midbrain

Hyperintensity in abducens nuclei

Hyperintensities in bilateral dentate nuclei
Findings (unlabeled)

T2-FLAIR MRI

T2-FLAIR MRI
Findings (labeled)

Hyperintensities in bilateral dorsal medulla (vestibular nuclei)

Hyperintensity in splenium of corpus callosum
Final Dx:

Metronidazole-Induced Neurotoxicity (MIN)
Case Discussion: Metronidazole-Induced Neurotoxicity

• Metronidazole is a commonly used antibiotic effective against protozoa and anaerobic bacteria.
• Generally well-tolerated in short courses, but risk of neurotoxicity suggested to increase with higher doses and longer duration of therapy.
• The current pathophysiology behind MIN is unclear, but proposed mechanisms include generation of free-radicals and causing vascular spasms that lead to localized ischemia.
Case Discussion: Metronidazole-Induced Neurotoxicity

• **Diagnosis:**
  • Diagnosis of exclusion
  • Should suspect in patients on long durations of high-dose metronidazole who present with neurologic dysfunction
    • Most common symptoms: cerebellar dysfunction (dysarthria, ataxia, dysmetria), altered mental status, and seizures
  • MRI T2W/FLAIR hyperintensities in specific regions can aid MIN diagnosis
    • In decreasing order of frequency, cerebellar dentate nucleus, midbrain (including periaqueductal region), dorsal pons, medulla, inferior colliculus, subcortical white matter, basal ganglia, thalamus, and cerebellar peduncles
Case Discussion: Metronidazole-Induced Neurotoxicity

- **Treatment**: Discontinue metronidazole
- **Prognosis**:
  - Majority of cases either improve (29%) or have complete resolution of symptoms (65%)
  - 3% of patients experience permanent cognitive impairment
  - Patients with cerebellar dysfunction less likely to have complete resolution than those with mental status changes or seizures
References:


