AMSER Case of the Month
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Complicated Headache with Fever

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Patient Presentation

CC: 30yr old female who was transferred from an outside hospital for a week of headache, fever, chills, nausea, vomiting, blurry vision, photophobia, and 3 days of L side facial pain, crossed eyes, episodes of vertigo, but no otorrhea

PMH: L side ear infection with purulent otorrhea treated with PO antibiotics in 2017, MVA in 2004 with head and L4/L5 injury

PSH/SH/FH: Not contributory

Meds: vancomycin, metronidazole, ceftriaxone started at the outside hospital

Vitals: T 36.8, PR 64, RR 14, BP 147/84, SpO2 98% on RA

PE: alert and oriented to time, person and place, equal, round and reactive pupils, CN1-12 grossly intact except R CN6 palsy, 5/5 bilateral UE and LE strength
Pertinent Labs

• WBC $14 \times 10^3$ with
  – Neutrophils 80%
  – Lymphocytes 12.1%

• Hb 10.3, HCT 30.4, PLT 437

• PT 15.6 PTT 35

• LP
  – Glucose 71
  – Protein 44
  – Lymphocytes 3
  – Neutrophils 80
Differential Dx Prior to Imaging

- Empyema
- Abscess
- Meningitis
- Encephalitis
- Intracranial hemorrhage
- Metastatic tumor
- Primary brain tumor

What Imaging Should We Order?
ACR Appropriateness Criteria for Headache

Variant 7: Headache, suspected intracranial complication of sinusitis and/or mastoiditis. (See the ACR Appropriateness Criteria® on “Sinonasal Disease”)

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<th>Radiologic Procedure</th>
<th>Rating</th>
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<td>MRI head without and with IV contrast</td>
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<td>MRI head without IV contrast</td>
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Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate

*Relative Radiation Level

This imaging modality was ordered by the ER physician.
What do you see on CT Head image without contrast?
Opacification of left ethmoid/superior sphenoid sinus

Opacification of left mastoid
Final Diagnosis
Left sphenoid/ethmoid sinusitis, mastoiditis and
left temporal subdural empyema
Pathophysiology of Subdural Empyema

• Epidemiology
  – Accounts for 20-30% of intracranial infections; others include brain abscess and epidural empyema

• Etiology
  – Bacterial infections gain access to the subdural space by direct extension of frontal sinusitis, mastoiditis, otitis media or most commonly retrograde thrombophlebitis of communicating veins
  – Posttraumatic infection of hematoma
  – Postoperative infection of a craniotomy cavity

• Pathology features
  – Infected CSF collections within the subdural space due to disruption of arachnoid meningeal barrier along the convexity and/or parafalcine and paratentorial regions of the brain

• Complications
  – Cortical vein thrombosis
Subdural pathology (e.g. empyema or hematoma): **concave** mass lesion on CT or MR

Epidural pathology: **convex** mass lesion on CT or MR
Various Subdural Pathologies

- **Subdural effusions**: sterile collection of fluid in subdural space
- **Subdural empyema**: purulent infection in subdural space
- **Subdural hygroma**: collection of fluid with similar characteristics to CSF with high protein contents
- **Subdural hematoma**: hemorrhage into subdural space
- **Subdural empyema** commonly requires surgical managements (burr holes or craniotomy)
- **Empiric antibiotics** regimens include vancomycin, metronidazole, plus one of cefotaxime, ceftriaxone, ceftazidime or cefepime
References

• “Neurologic complications of bacterial meningitis in adults” by Sexton DJ, Uptodate.com
• “Subdural empyema”, Sharma R and Gaillard F et al, Radiopaedia.org