

## Foundations Curriculum

### Oral Board Review Cases

## Case 52: Headache

### ❖ Chief complaint

- 35-year-old female brought in by husband with worsening headache and eye pain over the past 2 days.

### ❖ Vital signs

- **HR: 110** BP: 128/78 RR: 16 T: **101.2F** Sat: 99% on RA Wt: 60 kg

### ❖ What does the patient look like?

- Patient appears moderately uncomfortable secondary to pain, lying supine on stretcher.

### ❖ Primary survey

- Airway: speaking in full sentences
- Breathing: no respiratory distress, no cyanosis
- Circulation: warm skin, normal capillary refill

### ❖ Action

- Place patient on the monitor
- Obtain peripheral IV line (draw rainbow top)
- 1 L NS bolus
- EKG
- POC glucose (109, if asked for)

### ❖ History

- Source: Patient and husband
- HPI: a 35-year-old female presents with a “bad cold” over the past week with yellowish green nasal discharge and mild facial fullness and pain. Over the past 2 days she has developed a frontal headache and left eye pain. The headache was initially mild but has been becoming more severe, and is now associated with some nausea. Her left eye is now irritated and painful. She reports chills and subjective fevers. She also reports some sensitivity to light today and generalized weakness from being ill. ROS is otherwise negative.
- PMHx: none
- PSHx: none
- Allergies: none
- Meds: none
- Social: denies alcohol, smoking, or drugs
- PCP: Dr. Dease Bright

❖ **Secondary survey**

- **General:** alert, oriented × 3, uncomfortable due to pain, ill-appearing
- **Head:** mild tenderness over the left maxilla, otherwise normal
- **Eyes:**
  - Left eye- conjunctival injection and chemosis, slight ptosis, pupil 5 mm and reactive, + papilledema (if asked)
  - Right eye- normal examination, pupil 3 mm and reactive
- ENT: normal
- Neck: normal
- Lungs: normal
- **Heart:** tachycardia, otherwise normal
- Abdomen: normal
- Extremities: normal
- Back: normal
- **Neuro:** CN: visual acuity 20/40 bilaterally; left eye with decreased abduction, decreased periorbital sensation to touch, and + photophobia; otherwise normal
- Skin: normal
- Lymph: normal

❖ **Instructor Prompt:** discuss differential diagnosis

❖ **Nurse**

- Patient reevaluation and repeat vitals:
  - Reports some improvement of pain if given IV analgesia
  - Vitals after 1 L NS: **HR: 105** BP: 128/78
  - Vitals if no fluids given: **HR: 120** BP: 115/70 (Prompt: Give IVF bolus)
- EKG (**Figure 52.1**- sinus tachycardia)

❖ **Action**

- Order labs
  - CBC, BMP, LFT, coagulation studies, urine pregnancy, blood cultures x2
  - Consider lactate, ESR/CRP, urinalysis and cultures, thyroid studies, blood type and screen
- Order meds
  - IV antibiotics
    - Vancomycin + 3<sup>rd</sup>/4<sup>th</sup> generation cephalosporin + metronidazole
  - Antipyretic (acetaminophen)
  - IV analgesia (morphine or similar)
  - IV antiemetic
  - Consider dexamethasone (0.15 mg/kg IV)
- Order CT head without contrast
- Lumbar puncture (after CT)

#### ❖ Nurse

- **Case 52 Lab Results** (sig for WBC 16.5, HCO3 21, AG 14)
- Other Lab Results: **Lactate 2.9**, urine pregnancy negative, ESR/CRP elevated (if ordered), all other labs normal
- CSF Results: WBC: 40, RBC: 100, protein: 35, glucose: 50, clear, gram stain negative
- CT head (**Figure 52.2**- sinusitis bilaterally in the maxillary sinuses; no other abnormalities)
- Patient reevaluation and repeat vitals:
  - Still with moderate headache and nausea (give additional meds)
  - Defervescence if antipyretic given
  - Vitals unchanged

#### ❖ Action

- Imaging
  - Order MRI/MRV of head
  - Radiology calls back with results- MRV shows filling defect within the left cavernous sinus suggestive of cavernous sinus thrombosis
- Meds
  - IV antibiotics (if not already given)
    - Vancomycin + 3<sup>rd</sup>/4<sup>th</sup> generation cephalosporin + metronidazole
  - Heparin infusion
  - Dexamethasone (if not already given)
- Consult
  - Neurology
  - ENT
- Admit patient to MICU

#### ❖ Diagnosis

- Cavernous sinus thrombosis

#### ❖ Critical actions

- Early antibiotics and steroids
- CT followed by lumbar puncture
- MRV for diagnosis
- Disposition to ICU

#### ❖ Instructor Guide

- This case is of a cavernous sinus thrombosis that likely developed from a sinus infection. This is a serious infection of the veins within the brain that can be life threatening if untreated. The important early actions are to start antibiotics and steroids to treat presumed meningitis, obtain neuroimaging, and perform an LP. A head CT should be obtained before performing the LP due to the focal neurological deficits. The patient's severe pain should continue despite treatment and this should guide the learner to more definitive testing such

as MRV. If the MRV is not ordered, the patient should develop continued pain in the left eye, worsening vision, and ophthalmoplegia (difficulty moving the eye). If neurology or ENT is consulted, they will recommend MRV if not already obtained. The patient should be admitted to the MICU.

#### ❖ **Case Teaching Points**

- The differential for headache with cranial nerve deficits and/or ocular symptoms should include meningitis, encephalitis, intracranial abscess or hemorrhage, periorbital/orbital cellulitis, internal carotid artery aneurysm, idiopathic intracranial hypertension (pseudotumor cerebri), and acute angle closure glaucoma.

#### **Who was the patient's PCP named after?**

- Cavernous sinus thrombosis was first described by Dease in 1778 on autopsy reports. In 1831, Bright was the first to record the clinically recognizable findings seen with CST.

#### **What is cavernous sinus thrombosis (CST)?**

- Thrombosis of a branch of the intracerebral venous system
  - Cavernous sinus is most common location
- Most commonly due to an infectious etiology
  - Spread from facial, odontogenic, or sinus infection
  - Non-infectious CST is possible and should be suspected in hypercoagulable patients
- Diagnosis carries a high mortality rate (20-30%) and is associated with significant morbidity (residual neuro deficits)

#### **What are the high-risk history findings for CST?**

- Prior ENT or neurosurgical instrumentation
- Trauma to the area
- Manipulated furuncle in the central face

#### **What are the common presenting symptoms of CST?**

- Headache (90% of patients)
- Fever
- Ocular or retrobulbar pain
- Facial swelling
- Visual disturbances
- Lethargy or AMS

#### **What exam findings suggest CST?**

- Periorbital edema (earliest sign)
- Ptosis and/or proptosis
- Chemosis
- Ophthalmoplegia

- CN palsies
  - Lateral gaze palsy (CN VI)
  - Altered sensation over V1 and V2 distribution (CN V)
  - V3 shouldn't be involved since it descends posteriorly to the cavernous sinus
- Papilledema (late finding) and/or retinal hemorrhages
- Decreased visual acuity
- Meningismus and/or AMS
- Symptoms are initially unilateral but may become bilateral as infection and thrombosis spreads
  - Typically occurs within 24-48 hours of initial periorbital edema
  - Common and characteristic feature of CST

#### **What are the important anatomical structures involved?**

- CN VI (most commonly affected) leads to lateral gaze palsy
- CN V1 and V2 leads to altered sensation on the forehead and cheek
- CN III leads to fixed pupil
- CN III, IV, or VI leads to ophthalmoplegia

#### **What organisms are responsible for infectious CST?**

- *Staphylococcus aureus* is most common (70%)
- Can also see strep pneumo, gram-negative bacilli, and anaerobes

#### **What imaging should be obtained to evaluate for CST?**

- MRI/MRV
  - Imaging modality of choice
  - Can visualize thrombus at any stage
- CT
  - Typically done first since it is faster and more available
  - Negative scan doesn't rule out CST- can be normal early in disease process
  - Non-con scan can show increased density in cavernous sinus
  - CT venogram is imaging modality of choice if MRI is contraindicated
- 90% of patients will have multiple thromboses, so dural venous sinuses and cerebral veins should also be carefully evaluated

#### **What are the typically CSF findings in CST?**

- As meningitis may be related and presents similarly, CT followed by LP should be performed
- LP reveals inflammatory cells in 75% of cases

#### **What is the treatment for CST?**

- Broad-spectrum antibiotics
  - Coverage for gram positives, gram negatives, and anaerobes
  - Vancomycin or nafcillin + 3<sup>rd</sup> or 4<sup>th</sup> generation cephalosporin + metronidazole

- Anticoagulation
  - Limited evidence suggests benefit for sinus thrombosis, but not for transverse or sagittal thrombosis
  - LMWH or UFH
  - Contraindicated if concomitant hemorrhage
- Steroids
  - Theoretical benefit of reducing inflammation and edema
  - Not well-supported
  - Strongly consider if adrenal insufficiency present due to pituitary ischemia/necrosis
- ICP management as needed
- Source control for primary infection site (e.g., surgical drainage of dental abscess)

#### **When should you get a CT head before doing an LP?**

- If you think CT will show a cause for the headache, do a CT
- If a CT is indicated for other reasons (depressed conscious level, focal neurology), do a CT
- If a patient is to undergo LP for suspected meningitis, and they have a GCS of 15, normal neurological exam (including fundi), no history of CNS disease, no new onset seizures, and are not elderly or immunosuppressed, there is no need to do a CT first
- If you're seriously worried about meningitis and are intent on getting a CT prior to LP, don't let the imaging delay antimicrobial therapy

#### **What CT findings prohibit an LP?**

- Midline shift
- Obstructive hydrocephalus
- Compressed basilar cisterns
- Posterior fossa mass

#### **❖ References**

- **Original Case Source:** Emergency Medicine Oral Board Review Illustrated (1st Edition), Dr. Yasuharu Okuda, Dr. Bret Nelson, Case 52 (Author: Dr. Bing Shen)
- Primary Editor: Dr. Kristen Grabow Moore
- Additional Editors: Dr. Scott Heinrich, Dr. Jeremy Berberian
- **References:**
  - Original case references- Rosen's: Chapter 69; Tintinalli: Chapter 242
  - Medscape emedicine "Cavernous Sinus Thrombosis" (Author: Rahul Sharma, MD)
  - Ferri F. *Ferri's Clinical Advisor 2008*. 10th ed. Elsevier: Mosby, Philadelphia, PA; 2007.
  - Yanoff M, Duker JS. *Ophthalmology*, 2nd ed. St. Louis, MO: Mosby-Year; 2004.
  - Ebright et al. Septic Thrombosis of the Cavernous Sinus, *Arch Intern Med*. 2001;161(22):2671-2676

## Case 52 Lab Results

<b>Complete blood count:</b>		<b>Liver function panel:</b>	
WBC	16.5 x 10 <sup>3</sup> /uL	AST	32 U/L
Hb	14.1 g/dL	ALT	14 U/L
Hct	42.5%	Alk Phos	90 U/L
Plt	250 x 10 <sup>3</sup> /uL	T bili	1.1 mg/dL
<b>Basic metabolic panel:</b>		D bili	0.3 mg/dL
Na	135 mEq/L	Amylase	30 U/L
K	4.5 mEq/L	Lipase	40 U/L
Cl	100 mEq/L	Albumin	4.5 g/dL
CO <sub>2</sub>	21 mEq/L	<b>Urinalysis</b>	
BUN	15 mg/dL	SG	1.018
Cr	0.9 mg/dL	pH	6.8
Gluc	96 mg/dL	Prot	Neg
<b>Coagulation panel:</b>		Gluc	Neg
PT	13.1 sec	Ketones	Neg
PTT	26 sec	Bili	Neg
INR	1.0	Blood	Neg
		LE	Neg
		Nitrite	Neg
		Color	Yellow

Figure 52.1- EKG

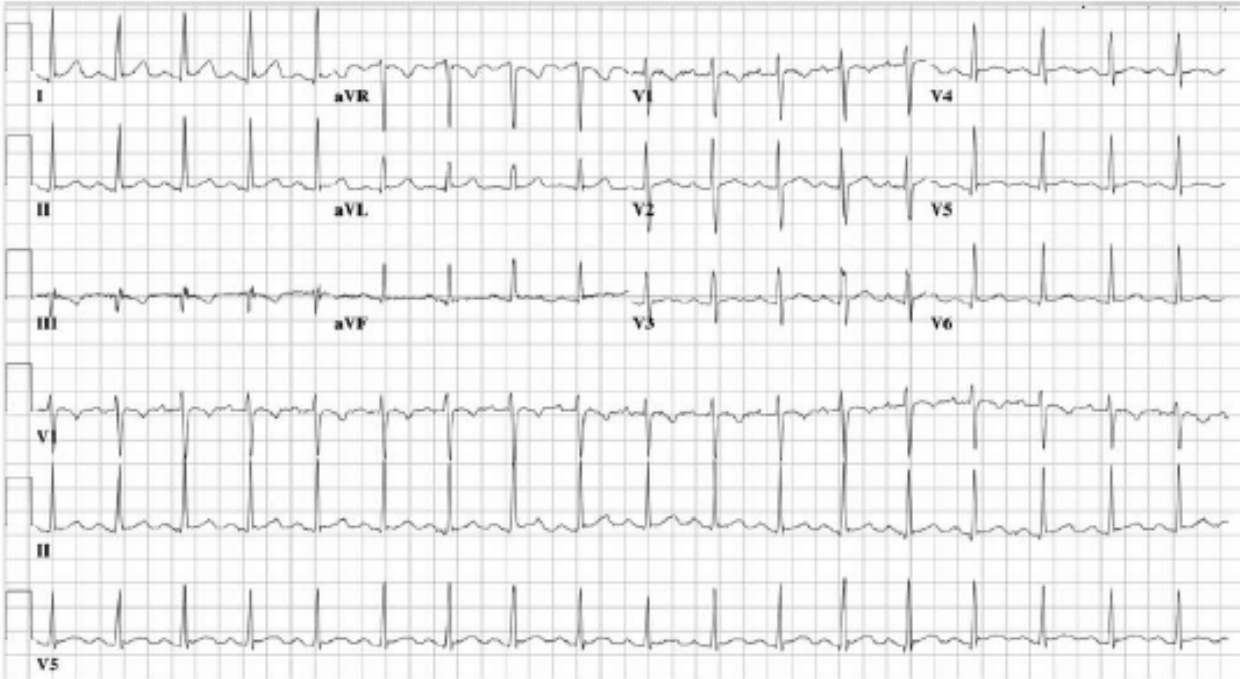




Figure 52.2- CT Brain

