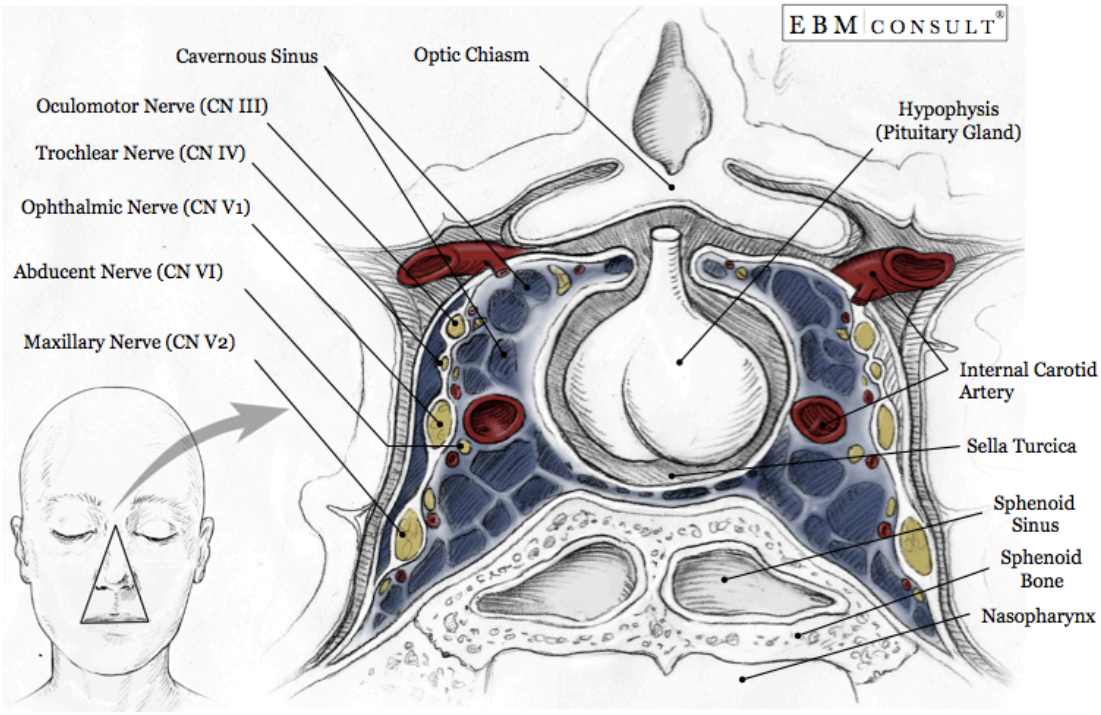
Cavernous Sinus:

- **Location:** The cavernous sinus is located on either side of the sella turcica and superior to the sphenoid bone.
- **Anatomy:**



- **Blood Supply:**
  - The cavernous sinus is made up of very thin walled veins that make up a venous plexus
  - The cavernous sinus receives venous blood from the following:
    - Superior middle cerebral vein
    - Superior and inferior ophthalmic veins
    - Sphenoparietal sinus
  - Venous blood drains posteroinferiorly to eventually empty into the pytergoid plexuses.
- **Contents:**
  - Internal carotid arteries & its small branches
  - Carotid plexus of sympathetic nerve
  - Abducens nerve (CN VI)
  - Maxillary nerve (CN V_2)
  - Oculomotor nerve (CN III)
  - Ophthalmic nerve (CN V_1)
  - Trochlear nerve (CN IV)
- **Function:**
  - Facilitate heat exchange from the between arterial and venous blood as they transverse each other.
- **Clinical Application:**
  - *Cavernous Sinus Thrombosis*:
    - The veins of the face drain blood into the cavernous sinus via the superior ophthalmic vein. As such, infections of the face (especially involving the "danger triangle" (orbits, nasal sinuses, and superior part of the face) can cause a cavernous sinus thrombosis.

    - Staphylococcus aureus is seen in up to 70% of patients with this complication
    - Other bacteria include: Streptococcus, H. influenza
- Patients presenting with cavernous sinus thrombosis will usually complain of a headache, a cranial neve deficit involving CN III, IV, V_1, V_2, and/or VI, and unilateral eye swelling that progresses to bilateral eye swelling
- Complications:
    - Septic thrombosis of this area can also cause acute meningitis.
    - Fairly rapid changes in mental status (confusion and fatigue)
    - Death
- Work-Up:
    - Labs: CBC, +/- D-dimer (possibly helpful), +/- CSF
    - Imaging: Noncontrast CT head or MRI with MR venogram (MRV)
- Treatment:
    - Empiric antibiotics to include:
        - Vancomycin 15 mg/kg IV every 12 hours + ceftriaxone 2 g IV every 12 hours
        - If source is dental, add on metronidazole
    - Heparin or low-molecular weight heparin at full doses (note: limited data but may be helpful).

- **References:**

1. Misra UK et al. D-dimer is useful in the diagnosis of cortical venous sinus thrombosis. Neurol India 2009;57(1):50-4.
2. Korchi AM et al. Imaging of the cavernous sinus lesions. Diagn Interv Imaging 2014;95(9):849-859.
3. Tang Y, et al. The imaging of conditions affecting the cavernous sinus. Clin Radiol 2010;65(11):937-45.
4. Coutinho J. et al. Anticoagulation for cerebral venous sinus thrombosis. Cochrane Database Syst Rev 2011;Aug 10. CD002005.