Septic Cavernous Sinus Thrombosis Following Tooth Extraction: A Rare Presentation

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DISCLOSURE

None
Cavernous sinus anatomy

- The right and left cavernous sinuses are situated on the lateral aspect of the sella turcica.
- They extend from the superior orbital fissure to the petrous apex of the temporal bone.
- They are interconnected by anterior and posterior inter-cavernous sinuses that encircle the pituitary gland.

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Cavernous sinus vascular anatomy

• The Cavernous sinuses receive blood from the ophthalmic veins, the superficial middle and inferior cerebral veins, and the sphenoparietal and sphenoid sinuses.
• The cavernous sinuses in turn drain into the pterygoid venous plexus via emissary veins, and into the internal jugular vein and the sigmoid sinus via the inferior and the superior petrosal sinuses respectively.
• Absence of valves in the cavernous sinuses and their connections favour bidirectional spread of infection.
• This can give rise to extensive thrombi throughout the network of sinuses.
Cavernous sinus vascular anatomy

Flow can reverse, pterygoid plexus has valves & can act as a suction pump (yawning). Danger for infection between angular & deep facial veins

http://www.instantanatomy.net/headneck/vessels/vcavernoussinuspterygoidfaceconnections.html
Cavernous sinus vascular anatomy


Axial CT showing a prominent left pterygoid venous plexus (normal variant)
Case Presentation

• 67y Male.
• Diabetic.
• Known for myasthenia gravis treated with steroids.
• He had an incomplete molar tooth extraction with retained infected fragment.
• Presented to ED few days later with fever, tachycardia, oral cavity pus and right mandibular pain.
• Initial CT of the head and neck showed the retained tooth fragment (number 48) with no definite abscess or other acute abnormality.
Case Presentation

- The CT was repeated 3 days after due to persistent fever and pain in spite of antibiotics
- CT findings:
  - Right masticator space abscess, swelling of the right muscles of mastication, right proptosis and enlarged right superior ophthalmic vein (SOV).
  - Larger right cavernous sinus as compared to the left, with reduced enhancement.
  - Slightly irregular outline of the cavernous portion of the right internal carotid artery.
Initial CT

3 days later CT

New right masticator space abscess with swelling of muscles of mastication

Progressive right proptosis and superior ophthalmic vein enlargement
Case Presentation

- A diagnosis of septic cavernous sinus thrombosis (SCST) was suggested from the CT findings and MRI was recommended.
- MRI confirmed the diagnosis; enlarged right cavernous sinus, thick adjacent dura and mild irregularity of the cavernous portion of the right internal carotid artery.
- This was complicated by: thrombosed SOV, right proptosis, right sided thickened intracranial dura (pachymeningitis).
- Additional findings: inflamed right sided muscles of mastication and facial soft tissue.

Axial T1 FS C+  Axial T1 FS C+  Axial DWI
Axial and coronal T1 FS C+

SOV thrombosis  Pachymeningitis  Inflamed soft tissue
Case Presentation

- The patient was admitted, treated by antibiotics and low molecular weight heparin.
- Follow up MRI after 20 days demonstrated marked improvement of the Right SCST, recanalization of the thrombosed right SOV and resolution of the pachymeningitis.
- The right masticator space abscess and the facial soft tissue and muscles swelling have significantly improved.
- The patient was clinically improved then discharged.
Initial MRI

20 days later MRI

Axial and coronal T2WI: Interval normalization of the size and signal of the right cavernous sinus
Discussion

- Septic cavernous sinus thrombosis (SCST) is thrombophlebitis of the cavernous sinus of infectious origin.
- Most commonly, SCST results from spread of infection from the paranasal sinuses, especially the sphenoid, ethmoid, and frontal sinuses, or from the middle one third of the face.
- Less commonly infection from teeth, nose, tonsils, soft palate, pharynx and ears (pharyngeal, otogenic, and odontogenic infections) may constitute primary source of the infection.
- Dental infections constitute less than 10% of the cases.
- The dental infection most commonly spreads via the pterygoid venous plexus, where an infected thrombus may extend or disseminate septic emboli.
Discussion

• The signs of Cavernous sinus thrombosis result from venous congestion due to impaired venous drainage from the orbit and eye.
• The onset is acute, usually with unilateral periorbital edema and proptosis associated with headache and photophobia.
• Examination may reveal ophthalmoplegia.
• The infection can spread to the contralateral cavernous sinus via inter-cavernous sinuses, usually within 1 to 2 days of the initial presentation.
• The diagnosis of CST is usually made on clinical grounds and can be confirmed by appropriate radiographic studies.
Discussion

• MRI and MR venography are more sensitive than CT scan for diagnosis.
• It may show a heterogeneous signal from the abnormal cavernous sinus along with deformity of the cavernous portion of the internal carotid artery, and an obvious hyperintense signal of thrombosed vascular sinuses.
• Complications can be also identified by MRI as presented in our case.
• S. aureus is the most frequently cultured organism in these infections (70%), followed by Streptococcus species (20%).
Discussion

- Treatment includes high-dose intravenous antibiotics.
- Empirically, patients should be started on antibiotics directed at the most common pathogens (Gram-positive, Gram-negative, and anaerobes).
- Antibiotics should be revised as soon as culture and sensitivity results are available.
- Patients are usually treated for 3 to 4 weeks.
- The role of anticoagulation therapy is still controversial.
- Early initiation (within 5-7 days) may help in reducing morbidity, but delayed use provides no benefits.
- No controlled trials have been performed in this regard.
- With the availability of good broad-spectrum antibiotics, the prognosis of septic CST has improved reducing mortality from near 100% to 20-30%.
Discussion

• Serious complications like septic pulmonary embolism, meningitis, carotid thrombosis, subdural empyema, and brain abscess may occur.
• Residual neurological deficits in the form of squint and numbness and paresthesia in the region of 5th nerve supply have been noted.
• Recurrence of CST also has been reported as late as 8 months.
• The favorable outcome depends upon prompt diagnosis and early initiation of antibiotics.
• The negligence of dental hygiene and dental infections can lead to disastrous consequences.
Conclusion

Septic cavernous sinus thrombosis due to dental infection is uncommon and leads to substantial morbidity and mortality.

The favorable outcome depends upon prompt diagnosis and early treatment with antibiotics.
References


THANK YOU